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### CANCER IN THE TERRITORY OF PAPUA AND NEW GUINEA: A PRELIMINARY COMMUNICATION.

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THE Territory of Papua and New Guinea lies wholly within the tropics and comprises the eastern half of the island of New Guinea and its peripheral island areas. These include the Admiralty group, the Bismarck Archipelago, the two northernmost islands of the Solomons group, the Trobriand Islands, the D'Entrecasteaux group and islands of the Louisiade Archipelago.

The population of the Territory numbers approximately 1,800,000, and the native people are predominantly Melanesian. The people live together in larger or smaller communities divided one from the other by geographical or linguistic barriers; they display a wide variety of cultural patterns, and have no real conception of political or social unity. In the main they are suspicious of western medicine, and, with the exception of those living in the

urban areas, are reluctant to avail themselves of it. They suffer from most of the diseases known in the metropolitan communities and from a number of conditions peculiar to their tropical environment.

In the year 1957-1958 the total number of hospital in-patients was 110,816. A study of the various diseases responsible for hospital admissions showed cancer to be one of the smallest groups, and it ranked tenth in order of importance as a cause of death.

Since January, 1958, the problem of cancer in the Territory has been the subject of a special study (with the help of the University of Sydney, St. Vincent's Hospital, Sydney, and the University of Western Australia). A continuing survey has been established whereby every case coming to the notice of the medical services of the Territory of Papua and New Guinea has been notified and recorded. The findings of this survey will be published in due course.

That our knowledge of cancer in New Guinea should be incomplete at this stage of development of the Territory is understandable. The Territory presents, on the one hand, a rugged and extremely broken terrain, sheltering isolated, densely populated pockets, and on the other vast areas of inhospitable country with a very sparse population. Medical patrolling is difficult, and employs medical personnel not all of whom are graduates. A widespread belief in magic and sorcery amongst the native people, coupled with a deep suspicion of western medicine,

accounts for the fact that most tumours are far advanced in their development when they are first reported. There is a high incidence of oral cancers and cancers of the skin. This is accounted for by the facts that these cancers are accessible, have striking symptoms and are more readily recognized.

A recognition of the limitations of our knowledge impelled us to begin an investigation, using the principle of sample survey, into the incidence of four types of cancer—namely, cancers of the skin, the breast, the oral cavity and the cervix uteri. Fifteen districts in the Territory have been selected, and in each district the entire adult population of a group of villages, 600 to 700 people, will be examined. It is estimated that our project will extend over years, and the investigating unit comprises ourselves, a nursing sister and a native medical orderly.

To ensure the success of such a long-range project, a preliminary survey has been conducted to define and test techniques in practice. This communication records the techniques, which included physical examination of the relevant sites and the examination of biopsy or cell-smear materials. Histological and cytological studies for this project were carried out by Dr. Virginia Prince of the Pathology Department, General Hospital, Port Moresby, by Professor R. E. J. ten Seldam of the University of Western Australia and by Dr. K. A. McGarrity, of the Royal College of Obstetricians and Gynaecologists, Sydney, and the cytological code used was as follows: Class 1, no suspicious cells seen; Class 2, metaplastic cells (changes associated with inflammation), not suggestive of malignancy; Class 3, suggestive cells seen, probably not carcinomatous; Class 4, suggestive cells seen, probably carcinomatous; Class 5, cells diagnostic of carcinoma.

The village of Hanuabada in Port Moresby was selected for the pilot study. Hanuabada is one of the oldest permanent native settlements in this Territory. The population of over 3000 people is Melanesian with certain traits of Polynesian inheritance. The original occupations of Hanuabadans were fishing and gardening with a limited amount of hunting. Now 95% of the males and 10% of the females work for wages and rations with the Administration of the Territory, or with private enterprise. The majority of females, in addition to their housework, take part in the cultivation of the gardens.

Social and environmental factors noted during the survey which may have relevance to the specific aims of the survey include the following.

The staple diet of Hanuabadans consists of rice, mainly brown rice, bread, fresh fish, tinned meat and fish, and locally-grown vegetables and fruit, such as yams, corn, sweet potatoes, bananas, pawpaws and mangoes. Tea drinking is universal amongst the villagers. Many of the children consume quantities of soft drinks. Most of the male population we examined drank alcoholic beverages in some form, and methylated spirit mixed with fruit juices is consumed by many Hanuabadans. The habit of smoking twist tobacco rolled in newspaper is common; 95% of the males and 75% of the females smoke tobacco. The males of the population begin to smoke at the age of 12 to 15 years, and females begin to smoke after marriage. Some of the better-paid villagers smoke imported tobacco. Almost all our patients chewed betel nut (areca nut) with lime and "pepper" bark. Some also use the pepper bean. This chewing habit begins at an early age—about seven or eight years—but the addition of lime and other ingredients occurs in early adolescence. The lime is obtained mainly from specific coastal areas, where it is made by burning and pulverizing shell obtained from the rivers. No cases of tobacco chewing were recorded.

Personal hygiene seemed satisfactory. The daily bath in sea or fresh water is accepted as a routine. Soap is frequently used. The town water supply is available at central points in the village, but only a handful of houses have it connected.

Prior to the actual survey, we met the Hanuabada village council to introduce the proposed investigation. At this

meeting a talk was given, illustrated with colour slides, to explain the need for a mass examination. In addition, further meetings were organized with the village women's club, to obtain the willing cooperation of the villagers through personal contact with us. A survey population was prepared from the village census book, and these subjects were advised in advance of the date of their expected attendance for examination. The examinations were carried out at the village health clinic. Survey cards for the recording of relevant findings were prepared prior to the survey.

The villagers who attended for examination were in good health. The average age for males was 35 years, and for females 34 years. In the majority of cases the dates of birth were recorded from the census book. In the cases of older people (over 50 years), the ages were estimated. The only significant element in the past history of our patients was tuberculosis. The tuberculous patients had received treatment in the past, or were currently receiving treatment for this disease.

### The Examinations.

#### The Skin.

Two hundred and seventy-eight villagers were inspected for malignant lesions of the skin. Most of the villagers were heavily tattooed, but only a few keloid scars were noted. Of the males 60% and of the females 50% presented widespread chronic desquamative dermatitis (tinea). It was observed that the sitting habit of the people leads to the development of a thick layer of callus tissue over the external malleolus. One male patient suffered from chronic traumatic osteomyelitis of the frontal bone with a discharging sinus on the forehead, and one had a mobile, well-defined soft-tissue tumour, 10 cm. in diameter, above the acromial end of the left clavicle. This was caused most probably by the carrying of heavy weights in the same position for many years. One tropical ulcer was seen. No malignant lesions of the skin were detected.

#### The Breast.

Fifty-four females underwent clinical examination of the breast. It was observed in 14 of the women that there was a remarkable asymmetry between the right and left breasts. Specific interrogation revealed no correlation with lactation habits. All children were fed from both breasts. No case of breast cancer was detected.

TABLE I.  
Cytological Findings in 47 Cervical Smears.<sup>1</sup>

Classification.	Age (Years).				
	16 to 19.	20 to 29.	30 to 39.	40 and Over.	Total.
Class 1	3	17	13	7	40
Class 2	—	—	3	—	3
Class 3	—	—	1	3	4
Class 4	—	—	—	—	—
Class 5	—	—	—	—	—
Total	3	17	17	10	47

<sup>1</sup> Bacteriological and hormonal studies of smears were not required. Repeated examination of smears from the four patients with Class 3 cells revealed cells diagnostic of carcinoma in one case.

#### The Cervix Uteri.

Fifty-three married women aged between 16 and 40 years attended for gynaecological examination. Six of them were pregnant. In the past, native custom has decreed marriage at 13 or 14 years for girls, but with the gradual sophistication of recent years there is a tendency to postpone the date of marriage until a more mature age. The 53 women had an average of four pregnancies; 50% of the women had more than three pregnancies, up to a maximum of 11, and eight of our patients were newly-married nulliparous women. Manual and instrumental

TABLE II.  
Oral Lesions.

Sex of Subject.	No Abnormality Detected.	Leukoplakia.	Angular Cheilitis.	Hyperkeratosis.	Atrophic Glossitis.	Lichen Planus.	Squamous-Cell Carcinoma.	Mixed Salivary Tumour.
Male ..	166	30	15	11	—	2	1	1
Female ..	47	2	2	—	6	—	—	—
Total ..	213	32	17	11	6	2	1	1

gynaecological examination was carried out in 50 cases, and cervical and endocervical smears were taken in 47 instances (see Table I). The presence of vaginal discharge was observed in 13 women, but in this respect no further investigations were carried out. In four women cervical erosions were noted, all of which proved to be non-malignant. Hypertonic saline effect was present in several smears, and this was probably due to the fact that patients bathed in sea water prior to examination. Four women were under review as the result of a cytological report of Class 3 cells seen in the cervical smears. On repeated smear examination, cells diagnostic of carcinoma were reported in one case.

#### The Oral Cavity.

Two hundred and seventy-seven villagers presented for oral examination. The examinations were conducted in a travelling dental chair with normal dental instruments. A head lamp was used on a few occasions when the natural lighting was inadequate. All but one of the villagers chewed betel nut.

In addition to the dental caries and periodontal disease expected in such a group, pathological changes were noted in the oral mucosa in 65 villagers, an incidence of 23.5%. Some of them exhibited more than one pathological change (see Table II). The clinical examinations were supplemented by cytological smears and biopsies from all suspicious lesions (see Table III). Two of the patients were found to have symptom-free malignant disease of the oral cavity, an incidence of 0.72%. Thirty-two cases of clinical leukoplakia were seen, and six of these were confirmed histologically. This is an incidence of 11.6%—an interesting percentage if leukoplakia is considered a precancerous lesion. Both of the cases of malignant disease, and the majority of those of leukoplakia, occurred in male patients, and all these patients were betel-nut chewers. Four villagers are under review because of cytological reports of Class 3 cells seen in the oral smears.

TABLE III.

Cytological and Histological Findings in 277 Oral Examinations.

Sex.	Number of Subjects Examined.	Oral Smears.					Biopsies.	
		No.	Cytological Interpretation : Class.					
			1	2	3	4		5
Male	224	23	11	7	5	—	—	8
Female	53	3	2	—	1	—	—	—
Total	277	26	13	7	6	—	—	8

#### Summary.

A long-range project investigating the incidence of four types of cancer amongst the indigenous population of the Territory of Papua and New Guinea is possible and practicable.

A pilot survey has been conducted on 277 adult members of a native village in Port Moresby. All these have

undergone clinical and, in some cases, instrumental examinations supported by cytological and histological investigations to detect cancer in four sites. Two cases of oral malignant disease and one of carcinoma of the cervix have been detected.

#### Conclusion.

Each individual examined will be given a small booklet containing the clinical findings of our examinations. This will provide a continuous medical record for future reference. An analysis of the findings of such a project may well provide information on the following topics: (i) the epidemiology of cancer in the Territory of Papua and New Guinea; (ii) possible aetiological factors in the disease as it occurs in different sites—for example, the relationship between betel-nut chewing and cancer of the oral cavity; (iii) the frequency of cancer of specific sites within a racial group; (iv) the incidence of cancer in a primitive people having a short life expectancy; (v) suggestions for specific research.

#### Acknowledgements.

We wish to thank Dr. R. F. R. Scragg, Director of Public Health, Territory of Papua and New Guinea, for permission to submit this article for publication.

#### PHYSIOLOGICAL HAZARDS OF SKIN DIVING.

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WITH the rapid increase in the popularity of skin diving in Australia, most general practitioners will come in contact with medical problems arising from this sport. While the problems usually involve simple physiological upsets, well understood by most medical men, it is surprising how many do not understand, or, rather, have not thought about these problems in relation to skin diving. For example, it would be interesting to know how many doctors understand why earplugs should not be worn by divers. There are certainly a large number of divers who do not understand these problems, and who either wear earplugs in ignorance, or avoid them because they "know they shouldn't wear them". Only a small number understand why.

The majority of problems encountered in diving are either a direct result of water pressure, or the effect of a combination of water pressure and inhaled gases.

#### Pressures Exerted on the Diver.

While the surface of water appears to be subjected to no pressure, it must be remembered that it is supporting the weight of the atmosphere and is thus under a pressure of 15 lb. per square inch (or one atmosphere). At a depth of 33 feet a further 15 lb. per square inch is added to the pressure. The absolute pressure at this depth is therefore 30 lb. per square inch or two atmospheres. Similarly at a depth of 66 feet the pressure is 45 lb. per square inch (three atmospheres) and at 99 feet it is 60 lb. per square inch (four atmospheres). Some confusion is sometimes felt about this absolute pressure reading; it is merely the



water pressure at the depth concerned to which has been added the pressure of the atmosphere. Thus the water pressure at a depth of 99 feet is 45 lb. per square inch, while the absolute pressure (the pressure actually exerted on the diver) is  $45 + 15$  (that is, 60) lb. per square inch. The water pressure increases by approximately half a pound per square inch for every foot descended.

It can thus be seen that the greatest relative change in pressures occurs near the surface. A diver descending from a depth of 66 to a depth of 99 feet is subjected to the change from three to four atmospheres (an increase of pressure of a further one-third), while a descent to 33 feet from the surface involves a doubling of the absolute pressure (from one to two atmospheres). This may appear strange, but anyone who has done any amount of diving below a depth of 50 feet (including myself) will tell you that the greatest changes in pressure are felt in the first 15 feet descended—whether one is diving with or without compressed air (or other gas supply). Any diver who can easily dive to a depth of 33 feet can quite easily and safely descend to a depth of 130 feet, provided that he observes other safety precautions with regard to the length of his stay, the rate of ascent and other factors mentioned elsewhere in this article.

#### Apparatus Used in Skin Diving.

It is necessary to mention briefly the type of apparatus used by divers in order to understand the problems involved. While diving can be undertaken without any apparatus in depths of up to about 20 feet (much greater depths can be achieved in the case of specially trained persons, such as pearl divers, who can easily descend to 60 feet with goggles only), this is rather pointless for the average person except as a stunt, and the usual minimum apparatus is considered to be a mask and pair of flippers (with or without a snorkel). The only danger associated with this type of diving is the effect of pressure on the eardrums and sinuses (this is discussed later). Compressed air delivered by an open-circuit unit is usually employed when the diver intends to stay below for any length of time. This compressed air may be delivered from a self-contained underwater breathing apparatus (aqualung) or may be pumped from a compressor on the surface through a thin rubber hose to a demand valve on the diver's face (in a similar fashion to that employed by the helmet diver). In some instances a closed-circuit apparatus delivering pure oxygen and having a soda lime carbon dioxide absorber can be used, but this is a hazardous piece of apparatus (unfortunately used too often by amateurs, as it is light and simple to use) which should be used only by experts in very shallow water. Its only advantage, in addition to its lightness and simplicity, is that it can be used without "tell-tale" bubbles escaping into the water, and thus is ideal for work in circumstances when the diver does not wish to reveal his presence (for example, wartime sabotage). Its real danger (the inhalation of high oxygen concentration) will be discussed later.

#### The Effect of Pressure on the Eardrums.

The first effect of water pressure to be discussed is that of pressure on the eardrums. When no breathing apparatus is worn this is a simple matter of an increase of the pressure on the eardrums. Provided that the Eustachian tubes can be cleared, the diver soon learns by practice to increase the pressure in the middle ear to balance the pressure on the drum from within the canal during descent. In ascent, provided that this is not too fast, the pressure will release itself and bubbles of air will be felt being discharged along the Eustachian tubes.

However, when a compressed-air unit is used, the problem is a little more complex. The demand valve is adjusted automatically to compensate for water pressure changes, and to deliver a pressure equal to the water pressure at the depth concerned, over and above the pressure delivered at the surface. It can thus be seen that, while it is inadvisable to use earplugs in a free descent, it is essential to avoid using them when one is

breathing compressed air. In the latter case the eardrum may rupture from within outward at a fairly shallow depth (from about 15 feet in some cases). The earplug may also be forced down the auditory canal by pressure as the diver descends, and during the subsequent ascent, as the plug cannot reverse, the drum may rupture inward as the pressure falls in the middle ear. Assistance is then required to remove the impacted earplug.

It should not be necessary to add that a person should not dive if he is unable temporarily (for example, after a cold or hay fever) or permanently to clear his Eustachian tubes. Unfortunately some people never seem to acquire this knack of clearing the tubes.

#### The Effect of Pressure on the Sinuses.

The effect of pressure on the sinuses is negligible provided that they are patent, as increasing pressure coming through the demand valve is transmitted to the sinuses and becomes equal to the increasing water pressure. However, when the ostia of the sinuses are swollen, as in the common cold or sinusitis, pressure effects may be felt on either descent or ascent, owing to the squeezing of blood vessels in the mucosa. In this case it is the ascent which poses the big problem. The pain of descent will usually cause the diver to desist in his attempt to descend. However, if air under pressure is forced into the sinuses at a depth and the ostia become blocked as the "squeeze" increases on ascent, the diver may suffer excruciating pain (usually frontal) after ascending. This can occasionally be eased by the use of decongestive nosedrops, but it may be necessary to cocaineize the ostium of the frontal sinus.

#### The Effect of Pressure on the Lungs.

Pressure effects on the lungs are rare, but extremely serious and frequently fatal. They do not occur at shallow depths, but may occur after ascent from depths below about 20 feet. It is essential that all divers going below this depth with compressed-air apparatus should realize that they must not ascend with a closed glottis. As the compressed air in the lungs expands during ascent, it is essential for them to breathe normally during ascent.

The greatest danger arises when a diver has to perform a "free ascent" from any considerable depth—for example, when his breathing apparatus becomes fouled under water. The instinctive desire is to take a lungful of air, close the glottis, and head for the surface as quickly as possible. Here lies the greatest danger in diving, and all divers should practise a "free ascent" and not dive deeply until they can master it. If this is not done properly the expanding air will rupture the alveoli, burst the blood vessels and cause air emboli to enter the blood-stream. Many fatal diving accidents are characterized by this picture of the diver arriving at the surface with frothy, blood-stained sputum coming from his mouth. When a diver performs a "free ascent" he must not keep his glottis closed and it is desirable that he breathes out very slightly, then ascends at the same rate as the air bubbles. This is easier to do than it sounds, as the air keeps on expanding, and, provided that one does not panic or breathe out too quickly, there appears to be an endless supply of air available.

#### Aspiration Pneumonia.

A rare pulmonary complication of diving is a pneumonitis or aspiration pneumonia caused by the oil used to lubricate the compressor of some surface compressed-air units. When this compressor is in an open boat which is rolling considerably in a heavy sea it is possible for this oil to enter the compressed-air chamber.

#### The Effects of Inhalation of Gases.

Apart from air emboli, the commonest cause of fatalities in diving is the noxious effect of the gases used under certain circumstances. These gases are carbon dioxide, nitrogen (which can cause either narcosis or "the bends") and oxygen.



### Carbon Dioxide.

The main hazard in the case of carbon dioxide, as in anaesthetic apparatus, is the possibility of the absorbing properties of the soda lime in a closed-circuit apparatus having been exhausted. Fresh soda lime should be used for every dive when this type of apparatus is used. Carbon dioxide build-up when oxygen is used will be discussed later.

### Nitrogen.

Narcosis or "rapture of the depths", as it is frequently called, is the term given to the drunken, uninhibited feeling which may come over the diver at depths greater than 130 feet, and usually appears at about 150 to 180 feet. In this state the diver develops a great sense of self-confidence and is likely to perform such strange and fatal acts as throwing away his facemask or merely going down and just keeping on. The latter is suspected to be the fate of Frederic Dumas (of "Silent World" fame), and the former that of Maurice Fargues, who attained, and recorded his signature, at a depth of 396 feet, but was brought to the surface drowned with his mouthpiece removed. This, a direct toxic effect of nitrogen under high pressure, with associated anoxia and carbon dioxide accumulation, is not unlike the effect of induction of and recovery from nitrous oxide anaesthesia or "laughing gas", as it was termed when its inhibition-releasing effect was first seen. This effect is in no way like, and should not be confused with, "the bends".

"Bends" ("diver's paralysis" or caisson disease) are produced by bubbles of nitrogen in the blood-stream causing emboli in nervous tissue and joints, and are characterized by pains in the joints and the back, itching of the skin and paralysis of the limbs. The onset of these symptoms may be considerably delayed, in some cases for as much as 24 hours. As previously explained, the greater the depth of descent, the higher the water pressure rises, and the greater is the pressure of gas delivered through the diver's demand valve. It appears to be impossible to develop "bends" at pressures below 2.25 atmospheres absolute—that is, at a depth less than 35 feet—and provided that the diver remains for only a short time below this depth (below 35 feet), no problem arises, as the small amount of nitrogen that has already gone into solution in the diver's blood and tissues can be readily dispersed as he ascends. After a short period of time (the deeper the dive, the shorter the time) the nitrogen fraction of the air goes into solution in the blood-stream and is carried to body tissues. Oxygen is metabolized as usual and carbon dioxide is expired as usual on ascent. However, on ascent, the nitrogen expands and forms bubbles at a quicker rate than it can be dispersed by the blood-stream. The diver has thus to ascend a certain distance, wait until more nitrogen is dispersed, and then ascend a little further and wait again. The number of such stops and the length of time for each is worked out by the diver's attendant on the surface, who signals to him when he must proceed or stop. They are determined from tables according to the depth to which the diver has descended and the length of time he has spent at that depth. It can be seen therefore that it is essential for divers to be aware of the depth to which they descend and of the time spent at that depth, and either to be able to memorize decompression times or to have an attendant who can supervise the decompression. It is easy for an inexperienced, unsupervised diver to give himself "the bends", particularly as it is so easy to lose track of time and depth in the fascinating pursuit of underwater adventure.

### Oxygen.

The inhalation of 100% oxygen is not infrequently associated with a condition called oxygen poisoning for want of a better term. The onset is usually sudden and characterized by nausea, vomiting, muscular twitching and incoordination, dizziness and convulsions. A rapid onset of symptoms occurs at depths below about 25 feet and even such experienced divers as J. Y. Cousteau will not use oxygen below 25 to 30 feet. A very interesting descrip-

tion of his first experience of pure oxygen is given in the first chapter of "The Silent World".

The incident occurred while he was chasing a fish at 45 feet; he states: "I descended and the fish backed away, keeping a good distance. Then my lips began to tremble uncontrollably. My eyelids fluttered. My spine was bent backwards like a bow. With a violent gesture I tore off the belt weight and lost consciousness." He assumed that his soda lime was at fault and later went back to the same place off Porquerolles and went down 45 feet with the new lung. "I convulsed so suddenly that I do not remember jettisoning my belt weight. I came very near drowning. It was the end of my interest in oxygen."

Although the cause of oxygen poisoning is not fully understood, several suggestions have been put forward. (a) A direct toxic effect on nervous tissue may be produced by the inhalation of 100% oxygen; however, this occurs only in association with hyperventilation, and is probably better explained by (c). (b) Carbon dioxide build-up may occur when the respiratory centre, depressed by pure oxygen, is unable to respond to the stimulus of carbon dioxide excess. (c) Burke (1961) puts forward an interesting inference that hyperventilation causes an altered acid-base balance, with a resulting rise in the lactic acid content of cerebral tissue, leading to decreased dissociation of oxyhaemoglobin and cerebral vasoconstriction, the net result being a paradoxical cerebral hypoxia. I do not intend to discuss the pros and cons of the above hypotheses in any detail, but would like to point out that these accidents have occurred in highly specialized divers trained to control their respiration and minimize their efforts underwater. I would like to suggest a further hypothesis without any experimental evidence to support it—namely, (d) that the breathing of pure oxygen, in combination with exposure to cold, may cause excessive slowing of peripheral circulation and peripheral vasoconstriction, giving rise to a paradoxical hypoxia (the stagnant variety of anoxia well known to anaesthetists and surgeons). Perhaps a combination of hypotheses (c) and (d) may account for oxygen poisoning, but this is no place to enter into a scientific discussion of causation.

Before the discussion of the noxious effects of gas is left, one further and fortunately rare hazard must be remembered—namely, the accidental filling of cylinders with an incorrect gas. While this is a rare hazard it is an extremely dangerous one. Cylinders have been known to be filled in error with nitrogen, usually from large stock cylinders on which markings have become worn, and are not easily identified. Unless the diver is certain that his cylinder has been filled from an air compressor he should test the gas by inhaling it for several seconds on land or on the surface before proceeding to dive, discarding it for testing if he begins to feel dizzy after a short time.

Small amounts of carbon monoxide may get into the air intake of a compressor from the exhaust gases, but the concentration is usually extremely low. This is fortunate, as carbon monoxide is virtually odourless and is not easily detected. The only practical precaution to be taken against this is to ensure that, if a wind is blowing when a cylinder is being filled out of doors (or when a surface compressor is used to supply air to the diver) the wind is blowing the exhaust away from the intake.

All the adverse physiological effects discussed are magnified in the presence of general malaise, fatigue, cold, over-exertion, excitement, hyperventilation and alcoholism. The diver should learn to keep a strict control over his exertions and respiration below the surface and, of course, he should avoid the combination of alcohol and diving. Alcohol not only impairs judgement, but increases the threshold of fatigue much more than on the surface. One should not dive when one is excessively tired, cold or unwell in any way; but this is particularly so if one is suffering from a cold, hay fever, sinusitis, ear infection or injury.

### Accidental Drowning.

In addition to the hazards already mentioned, it must be noted that drowning due to panic is one of the commonest causes of diving fatalities, particularly with inexperienced divers. This may happen in certain circumstances unforeseen to the inexperienced diver—as, for example, when a diver's face mask floods with water and he is unable, through inexperience, to expel the water. It may also occur when a diver first enters the water encumbered by a collection of strange apparatus, and, as he attempts to breathe through his mouth only, water is aspirated around the mouthpiece. This in turn causes panic, with the consequent coughing and spluttering and further aspiration of water. Occasionally two divers have to ascend from a considerable depth sharing a demand valve, when the air supply of one diver has become exhausted. This routine should be familiar to any experienced diver, but several fatalities have occurred under these circumstances when inexperience has led to panic. The only effective way to cope with this problem is to ensure that beginners obtain experience in such routines under the supervision of experienced divers before attempting to perform them alone or with an inexperienced friend. The treatment of such accidental drownings is the same as for drowning from any cause, with emphasis on the commencement of positive-pressure insufflation as soon as possible, either by mouth-to-mouth resuscitation or by mechanical means when this is available (intubation, positive-pressure oxygen and so on).

### Summary.

The physiological hazards of skin diving are discussed in such a way that the general practitioner, faced, as he will be, by an increasing number of patients inflicted with injuries from the sport (this does not, of course, include the large number of traumatic injuries from physical hazards, such as spear guns, oyster shells and so on), will be able to recognize and treat the injuries, and, perhaps more important, will be able to advise how to avoid further injury.

The dangers discussed are pressure effects on the eardrums and the sinuses, ruptured alveoli and air embolism, pneumonitis, carbon dioxide accumulation, nitrogen narcosis, diver's paralysis, oxygen poisoning, accidental drowning and the rare but dangerous accidental filling of cylinders with the wrong gas. Precautions are suggested for minimizing these hazards.

This is in no way intended as a scientific paper and I make no apology for its rather unscientific manner of presentation. It is intended mainly as a guide to the general practitioner.

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### MEDICAL HAZARDS OF SKIN DIVING.

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OVER the past few years skin diving has become very popular the world over and particularly in Australia, where traditionally swimming has been one of our major sports and recreations. It has been estimated that about 200,000 people in Australia regularly go skin diving for spear fishing, underwater exploration and research or underwater photography. These activities are not only

confined to the warmer season, as many enthusiasts wear warm protective clothing and continue to dive during the winter months.

Skin diving may be done with minimal apparatus—namely, a face mask (to enable one to see clearly under water) and a snorkel (to enable one to breathe air from the surface whilst the face is still in the water)—but more commonly self-contained underwater breathing apparatus is used. This apparatus may be one of two types: (i) the "open-circuit" type (by far the most popular), which consists of compressed air in tanks (compressed to 2000 lb. per square inch), a regulator that assures correct mouth air pressure at any depth and a demand mouthpiece with a valve that connects to the air tanks by means of a rubber tube; (ii) the "closed-circuit" type. In this apparatus 100% oxygen is rebreathed after being passed through soda lime which absorbs carbon dioxide and excessive moisture. This apparatus is more complicated, and as its use is practically confined to military personnel (naval clearance divers), it will not be the subject of further discussion.

With the increasing numbers of individuals who are taking up the sport, often without joining clubs in which instruction is available in the correct use and handling of the self-contained breathing apparatus, many serious accidents have occurred, and although it is difficult to collect accurate figures, it appears that approximately 20 of these accidents have been fatal.

It is quite likely that a private practitioner may be the first person in a position to give medical help shortly after a diving mishap, and it would be to his advantage to be aware firstly of the dangers that may be present in this sport, secondly how he can best provide help after such an accident, and thirdly what precautionary advice he can give to an intending skin diver, if he is asked for it.

The hazards that may occur are directly or indirectly related to the use of self-contained underwater breathing apparatus, as there is a limit to the difficulties that a free diver, dependent on a lungful of air, can get into—he will seldom go to a depth of more than 40 feet and he can remain there for a relatively short time only.

It may be worth while to consider briefly some aspects of physiology before the pathological states ensuing from accidents are dealt with. This mainly involves the physiology of pressure changes. For every two feet one descends below the surface the pressure is increased by 1 lb. per square inch. For every 33 feet depth the pressure is increased by one atmosphere of pressure. Therefore the change in pressure experienced in going 33 feet below the surface is the same as that experienced in travelling from outer space to sea level—namely one atmosphere of pressure.

At a depth greater than two feet from the surface the pressure on the chest wall is such that a person has not sufficient muscular power to breathe in air through a pipe to the surface, unless the air is pushed in under pressure. At a depth of 100 feet the pressure is three times greater than atmospheric (four atmospheres of pressure absolute). Unless air piped to a man at that depth is at a pressure of more than 45 lb. per square inch above atmospheric, he will be unable to suck the air into his lungs. This gives one an idea of the great pressure changes that are involved. In regard to the physiology involved two laws may be remembered: (i) Boyle's law, which states that if the temperature is constant the volume varies inversely with the pressure; (ii) the law of partial pressures, which states that the pressure of a gas mixture is equal to the sum of the partial pressures of each gas contained in the mixture. After a consideration of Boyle's law it will be obvious that this will have an important application in diving.

A person at a depth of 66 feet with a lungful of air will have to breathe out continuously as he ascends, as five litres of air at that depth will become 15 litres at the surface. This sounds terribly simple and one may say that the increase in intrathoracic pressure would force one

to breathe out, and that the glottis would be forced open. This may not be so at all, particularly if a rapid ascent is made by a person in a frightened or panic state—for example, after a shark has been sighted or after a sudden failure in the diving apparatus. We know the lung tissue is relatively fragile, but if the person has in addition minor non-clinical (congenital) cyst formation (which is more common than hitherto thought), he is susceptible to severe injury. This has been the cause of one fatal accident in Sydney during the past 12 months.

When I was attending a compressed-air diving course in one of the armed services a trainee diver developed mediastinal emphysema, which tracked up into the neck tissues and presented as "crackling" under the skin in the neck. This was presumably the result of air leaking out via the torn wall of a pulmonary cyst. Fortunately the air was absorbed over a three-day period without any untoward effects. This condition developed while diving exercises were going on in less than 20 feet of water.

Remembering to breathe out continuously while ascending (by just floating up passively at the rate of one foot per second) is the most important single requirement of a diver. Even an ascent from 100 feet can be done comfortably in about one and a half minutes when one remembers that one lungful of air at this depth has a volume of four lungfuls at the surface.

Changes in pressure affect only gases to any extent—not solids or liquids. Apart from the gas in the lung space, some gases in the intestinal tract and some in the head sinuses, the rest of the body is liquid or solid and therefore does not require further consideration. The gas in the intestine, too, can be neglected, as it is virtually sealed off from the receipt of further gas from exterior sources, and decompression after ascent results in no extra gas being present that was not there previously.

The air spaces of the head can provide trouble if sinus mucous membranes are inflamed or swollen—for example, from allergy or upper respiratory tract infection. However, more important still is the condition of the Eustachian tube. Unless the ears can be cleared (that is, the mouth of the Eustachian tube opened) by swallowing or a similar action, which equalizes the pressure on both sides of the ear drum, diving should not be attempted, as the diver will be aware of acute discomfort at a depth of as little as eight to 10 feet. Pain will be quite severe at 15 feet depth and perforation or rupture may occur before a depth of 20 or 25 feet is reached. On the other hand there is no limit to the depth one can go down provided that the ears can be cleared periodically. During ascent the same problem does not arise, as the air can force its way past the valve-like opening in the nasopharynx. It may be remembered that it is only when an aircraft is making a descent that passengers are likely to have trouble with their ears. Should the external meatus contain excessive hard wax, this may become impacted as the canal narrows, and at still greater depth may result in the ear drum being blown out into the canal by the relatively greater pressure on the middle-ear side of the drum—these are the so-called reversed ears.

With regard to the head sinuses, especially the frontal and maxillary sinuses, the following points should be remembered: if the opening is partially occluded, as by a boggy membrane, the air pressure may gradually be equalized during a dive, but pain may develop after ascent, owing to the increased pressure inside the sinus taking time to become equal to the now relatively low pressure of the outside atmosphere. Distortion and strain on the membranous lining often result in the tearing of capillaries and bleeding, which may lead to further complications.

Aerodontalgia may become severe even at relatively shallow depths. This is the result of increased pressure in a diseased pulp cavity. Intestinal pain and discomfort may result if air is swallowed during a dive, owing to the expansion of air in the stomach or intestine. Heartburn may also result if the diver spends much time in a relatively inverted position, which allows some leakage of gastric juice through the cardia.

Goggles should not be used in diving to depths below about 10 feet, since the pressure inside the goggles cannot be regulated as it can inside a face mask (the nose is inside the mask, which allows air to be breathed out, and thus prevents the mask being pushed against the face as the outside pressure increases). Although the goggles or mask is pushed against the face by the increasing pressure as the diver descends, there is a limit to the extent to which this can be done, and so a relative negative pressure develops on the inside of the goggles, tending to draw the eyes out; this can result in congestion and oedema of the soft tissues involved and injection of the conjunctiva.

Vertigo may result, particularly if a rapid descent is made. This can be due to one or a combination of several causes: firstly, unequalized pressure on the ear drums, caused by wax or a foreign body in one of the external meatuses; secondly, and most commonly, the tracking of cold water along the external meatus to the drum, which stimulates the flow of fluid in the semicircular canals of one or even both ears. Other factors may be responsible, such as very dirty water (for example, in an attempt to recover a body from muddy water) or darkness (for example, in a frogman attack at night); under such conditions visual righting reflexes are lacking. Psychological factors undoubtedly can play a part and can increase the effects of the physical factors.

The sensation can be very distressing. I can remember on one occasion I was descending rapidly down a rope attached to an object on the bottom of the harbour, and was attached myself to a lifeline which went to the surface. When at a depth of about 50 feet I thought I was revolving in a clockwise direction. So real was this sensation that I endeavoured to rotate myself in an anticlockwise direction around the rope. This resulted, after several minutes, in my getting my lifeline tangled and twisted around the rope, and my taking considerably longer to extricate myself from the mess.

Vigorous, unnecessary movements of the arms and legs can result in a great increase in oxygen consumption and therefore in breathing. Besides using up valuable air, it can give one the subjective feeling of not being able to get sufficient air and can lead to panic. A similar situation may arise if the diver and his equipment become tangled up in a snag, such as heavy seaweed or cord from a spear gun; this causes him to make an excessive effort to free himself, and if this is unsuccessful at first he may become very anxious, setting in motion a vicious cycle ending in panic, which could have a fatal outcome. Panic is as great a danger to the diver's well-being as "the bends", and unless a person feels confident of himself and his apparatus in the underwater environment he should not go skin diving, at least with self-contained apparatus.

Much has been written about "the bends" and I will mention this only briefly, because the average skin diver will not stay down deep enough or long enough for decompression by stages to be necessary. In depths of less than 40 feet nitrogen retention in the body can be disregarded and even at a depth of 100 feet the diver would have to remain for over 15 minutes before he would run any risk of decompression illness. At a depth of 300 feet (10 atmospheres of absolute pressure) nitrogen absorbed is just as narcotic as nitrous oxide and gives rise to nitrogen narcosis, the so-called "raptures of the deep". However, it must be remembered that the total time spent at such a depth in any twelve-hour period is the factor of importance, so that the absorbed nitrogen in the blood of a diver who does several deep dives in one day may possibly reach the critical level. Symptoms of decompression most likely to be encountered are headache, painful joints, numbness in parts of the limbs, pruritus due to minute bubbles of nitrogen under the skin, dizziness, general malaise, mild shock, nausea and perhaps vomiting. The condition naturally should be treated by recompression and then decompression by stages. The naval authorities, if contacted, will advise where the nearest recompression chamber is located.



If the closed-circuit apparatus (with pure oxygen) is being used, the diver is confined to depths no greater than 33 feet for a stay of no longer than just a few minutes. At depths greater than 30 to 35 feet oxygen poisoning may supervene and this may be fatal. Pure oxygen administered under pressure interferes with intracellular-extracellular gaseous exchange, affecting intracellular enzyme systems and the blood pH, and causing tissue asphyxia. There is a marked difference in oxygen tolerance in any group of divers and one is unable to predict this, since it has no correlation with the age, height, weight, personality, smoking habits or alcoholic intake of the person or the temperature of the water. The individual's tolerance also varies from time to time. Fatal accidents can be caused by individuals filling up the ordinary self-contained underwater breathing apparatus cylinders with oxygen and using them at depths of 40 to 60 feet.

Another danger that may arise from the filling of compressed-air cylinders with oxygen is that of explosion, particularly if there is a trace of oil in the cylinder, as oil under high pressure acts as a catalyst in the presence of oxygen. Should an explosion occur and shatter the cylinder, death is inevitable for all in the immediate vicinity, as shrapnel can travel half a mile. The sudden increase in air pressure, apart from flying pieces of metal, can cause severe injury to anyone within a radius of 25 feet. I emphasize this because half a dozen people in Australia were killed in this fashion during the summer of 1960-1961.

The air intake of the compressor of course should be some distance from the motor exhaust, as small amounts of carbon monoxide can convert the cylinder's contents to a poisonous mixture. It is unwise to fill bottles from reservoir cylinders unless there is absolutely no doubt about the composition of the contents and this is clearly marked on them. This all seems terribly elementary, but deaths have occurred as a result of people using bottles filled with nitrogen.

#### Safety Measures.

The following advice is well worth the skin divers' notice.

##### Before a Dive.

1. Be certain of the gas mixture contained in the cylinders and take a few breaths from the set before entering the water.
2. Check the apparatus and see that the set is working and has no valve leaks.
3. No alcohol and no cigarettes should be taken in the hour or so preceding a dive.
4. Do not dive directly after a meal, particularly a heavy one.
5. See that ears can be cleared (by holding the nose and blowing).
6. Nervous people should be discouraged from diving.

##### During the Dive.

1. Do not dive alone.
2. Keep clearing the ears whilst descending.
3. Do not make any unnecessary movements, as it wastes air and energy.
4. Do not remain in the water if you are feeling excessively cold and are shivering.
5. On coming to the surface, particularly from great depths, do not hold the breath, but keep exhaling.
6. Look up and put your hand up whilst coming up, so that there is no possibility of banging your head against a heavy object on the surface.

##### After the Dive.

1. Always wash the apparatus well in fresh water, as the presence of salt increases greatly the rate of corrosion.
2. Whatever air under pressure remains in the cylinders leave there; do not empty them, as the reduction of the pressure to nil may well cause some condensation of water inside the cylinder, which can

lead to internal rust. This in turn can be very dangerous, as it causes weakening of the walls and could lead to shattering under pressure.

#### Conclusion.

This article has covered more than the bare medical hazards involved in skin diving, but the additional relevant information will be invaluable if it is at the disposal of medical practitioners, who, as citizens of the community, may find themselves in a position to prevent an accident. It is amazing how many inexperienced, uninstructed and immature youths go diving with apparatus which they do not understand.

#### Acknowledgement.

I would like to thank Dr. Shane Watson and Lieutenant-Commander R. Titcombe for their helpful advice.

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#### OTITIC BAROTRAUMA IN DIVERS.

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AND

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The titles "ears" and "reversed ears" are those used commonly by divers in describing two special forms of barotrauma. It seems to us that as more and more people use underwater activities as a form of sport, these lesions assume a greater importance in everyday medicine.

During two years at the Royal Australian Navy School of Diving, all divers have received routine ear, nose and throat examination at regular intervals. In the course of this we have been able to study the various traumatic lesions which occur in the tympanic membrane as a result of barotrauma. We have found that the appearance can be divided into the following conditions: (i) normal ears, (ii) "exercised ears", (iii) "resting ears", (iv) "ears", (v) "reversed ears".

##### Normal Ears.

Personnel first seen and accepted for training have normal translucent tympanic membranes and no detectable organic or structural abnormality.

##### "Exercised Ears."

"Exercised ears" are seen in both the beginner and the experienced diver after any recent dive. One sees general injection of the drum membrane, principally in the upper half and in the pars flaccida.

##### "Resting Ears."

There is no doubt that the macroscopic appearance of the tympanic membranes of experienced divers differs from the normal even in the absence of recent diving. The drum in these cases shows some thickening with increased opacity. This is readily demonstrated when the diver is asked to perform the Valsalva manœuvre.

##### "Ears."

In the condition known as "ears", the diver presents complaining of pain or bleeding from the ears. This may be due to any of the following changes:

1. "Exaggerated exercised ears." This condition occurs when the Eustachian tube is sluggish in opening and allowing passage of air in one direction or the other as the diver ascends and descends. In almost all beginners there is some degree of this condition until "facilitation" is achieved in the opening of the Eustachian canal. An exaggerated condition of "exercised ears" is seen in the erythematous injection of the drum and adjacent tissues.

2. Haemorrhagic bulla formation in the external canal without evident perforation. In these cases it is difficult to exclude perforation until examination after the lesion has subsided. A large, dull-red or purple opaque swelling may be seen, usually in the upper hemisphere and extending from the edge of the tympanic membrane into the external canal. It may or may not rupture spontaneously.

3. Haemorrhage into the middle ear without evident perforation. The blood may be seen behind the discoloured drum and a fluid level may then or later be evident.

4. Ruptured tympanic membrane. This may be associated with severe bleeding or with no apparent bleeding. In its simplest form a split may be seen in the drum usually in the lowermost segment. There may be hematoma formation (haemorrhagic bulla) in the external auditory canal. This when present appears as a bullous purple swelling which obstructs the external canal, partially or completely. Later examination shows that the bulla extends from the junction of the external layer of the tympanic membrane with the epithelium of the external canal. There may be a middle ear full of blood, and the diver may have expectorated blood. There may be nothing but quiet perforation which is associated with little or no pain. The question may arise, in rare cases in which a medical examination before diving was not possible, whether the patient already had a preexisting perforation. However, the almost inevitable entry of some water to the middle ear in such a case soon produces a degree of inflammation which clouds the decision.

#### "Reversed Ears."

The paradoxical state of "reversed ears" is met in divers when they use a hood which excludes water from the external canal. Pressure changes are transmitted to the middle ear via the Eustachian tube, so reduction in middle-ear pressure is readily achieved on ascending, air thus escaping from the Eustachian tube to the pharynx. However, the covering over the external ear—usually a rubber pad—fits firmly against the external canal, thus forming a plug held in place by the pressure of water. This causes less free adaptation in the external canal to the outside pressure changes, and the tympanic membrane undergoes considerable stretching, some of which is painful. With descent the membrana tympani is stretched outwards into the external ear, as the pressure can "equalize" in the middle ear via the Eustachian tube, but is prevented from increasing correspondingly in the external ear by the tight-fitting rubber hood occluding the external ear. A stage can then be reached (and has been experienced by one of us—S.W.) in which a change of depth—a few feet up or down—produces really intense pain in one or occasionally both ears.

The condition is exaggerated if some air has escaped from the external canal, and the external covering is then very closely fitting. Sponge rubber pads with channels cut across them are often used, but do not prevent the condition from developing in even the most experienced divers. Even a few feet of ascent and descent may bring the condition on quite rapidly and without warning. The diver is then seen to have a bleeding ear. It has been common practice to ignore the condition, and apparently rapid and complete healing can result. However, in most cases there is a perforation present, although one has seen each of the variations previously described under "ears" in these cases.

The essential difference between "ears" and "reversed ears" is the mechanism of production. "Ears" result from Eustachian obstruction or tardiness in allowing passage of air. "Reversed ears" result from obstruction to the external canal, which prevents external canal

pressure from adapting itself to the depth simultaneously with the middle-ear pressure, which is adapting itself via the Eustachian canal.

#### Summary.

Various disorders in the external auditory apparatus of divers have been described and their mechanism of production has been discussed. Previous literature on this subject seems confined almost entirely to articles on air medicine; but the changes in barometric pressure in that field are limited to less than one atmosphere.

After seeing many divers with the conditions described, we believe that a clear understanding of the underlying mechanism is essential in recognizing and treating these patients.

#### Acknowledgement.

Our thanks are due to the Medical Director-General, Surgeon Rear-Admiral Lionel Lockwood, C.B.E., M.V.O., D.S.C., M.D., F.R.A.C.P., Q.H.S., for permission to publish this article and for helpful advice.

### PHENFORMIN (PHENETHYLBIGUANIDE) IN THE TREATMENT OF DIABETES MELLITUS: A PRELIMINARY REPORT.

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SINCE the introduction of the sulphonylurea compounds for the oral treatment of diabetes, their modes of action, fields of usefulness and limitations have been extensively explored (Williams *et alii*, 1959; Downie *et alii*, 1957). Their introduction has stimulated research for other orally given compounds with hypoglycaemic effects, and with a wider field of application. In 1956 a biguanide compound (phenformin, phenethylbiguanide, D.B.I.) was released for clinical trial, and there are now numerous reports on its effect from the United States of America, the United Kingdom and Europe (Mehnert and Krall, 1960; Symposium Issue, 1960). The structure of D.B.I. is shown in Figure 1. It is chemically related to the "Synthalin" pre-

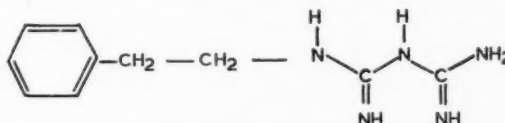


FIGURE 1: Phenethyl-formamidino-guanourea (phenformin; D.B.I.).

parations which were introduced for the treatment of diabetes just prior to World War II.

D.B.I. has been used in this clinic since April, 1960, and the results of its use, and impressions of its future fields of application, are reported here.

#### Patients Studied.

D.B.I. has been given to 32 diabetic patients. All patients were admitted to hospital and given standard diabetic diets. A careful check was kept for any evidence of renal or hepatic damage. D.B.I. was not used as a routine in all new cases of diabetes considered suitable for oral therapy, but reserved for those cases in which it was believed, as a result of overseas experience, that it would have some advantage over the currently available agents. It was appropriate to classify the patients into four groups (Table I). Group I consisted of new diabetic patients (seven cases)—that is, newly diagnosed diabetics, and those whose previous control had been by diet alone. Group II consisted of patients who had shown failure of response to sulphonylureas (10 cases). These were all cases of secondary failure to treatment with tolbutamide, and most of the patients had also failed

to respond to chlorpropamide. Group III consisted of patients whose diabetes was unstable on insulin treatment—cases of so-called brittle diabetes (eight cases). Group IV consisted of patients to whom tablets were given for other reasons (seven cases). These were previously stable diabetics for whom oral therapy had been advised because of small insulin dosage, visual deterioration or occupational reasons.

TABLE I.  
Details of Patients Selected for Present Trial of D.B.I.

Group.	Number of Patients.	Age Range. (Years.)	Duration of Diabetes Mellitus. (Years.)
I	7	55-80	0-5
II	10	48-73	1-20
III	8	19-55	2-32
IV	7	47-79	1-21

#### Dosage.

D.B.I. is available in 25 mg. tablets. All patients commenced their treatment on an initial dose of 25 mg. twice daily. If there was a favourable response, with lack of side effects, the dose was increased, slowly and cautiously, every three or four days. Those patients maintained on D.B.I. are taking between 50 mg. and 150 mg. per day in divided doses. No patient has been given more than 150 mg. per day, as this is the recommended upper level of dosage that can be tolerated.

#### Results.

In all 32 patients were treated. D.B.I. was stopped in 10 cases because of the severity of the gastro-intestinal side-effects, in six cases because of lack of control of the diabetes, either by D.B.I. alone or by D.B.I. combined with sulphonylureas, and in two cases for irrelevant reasons. The remaining 14 patients, in whom D.B.I. has been successful, have continued with treatment for up to six months. Successful treatment means that the diabetes is adequately controlled, as shown by the absence of glycosuria and hyperglycaemia in patients not taking insulin, and by the reduction in glycosuria, with satisfactory blood sugar levels and freedom from hypoglycaemic reactions, in patients taking insulin. The blood sugar levels were, in all cases, satisfactory, but cannot be compared because of the difference in the acceptable standards for the different groups of patients treated, and by and large the levels were all estimated two or three hours after the morning meal, and were in the range of 150 to 250 mg. per 100 ml. In the group of patients taking insulin, there was usually a significant reduction in insulin dosage. The results, according to groups, are shown in Table II. These results appear to indicate that the majority of the good responses to D.B.I. therapy

occurred in those cases in which it was used in conjunction with a sulphonylurea or with insulin. This finding will be discussed later.

#### Side Effects.

The major side effects of D.B.I. are gastro-intestinal symptoms, such as nausea, vomiting, abdominal pain and diarrhoea. These were observed in 11 cases in this series, and were sufficiently severe to warrant cessation of treatment in 10 cases. The majority occurred within the first few days, while the doses were small, so the effect of lowering the dose was observed in only one patient. In this case the symptoms appeared when the dose was 125 mg. per day, but disappeared, with retention of satisfactory control, on a dose of 50 mg. per day. In one case the symptoms appeared after one month's treatment with D.B.I., and necessitated the cessation of treatment.

Mild to moderate ketonuria occurred in nine cases in the series. In some, it was associated with gastro-intestinal side-effects, but in others it appeared with good control of the diabetes, and eventually disappeared with continuation of treatment. This effect has been noted previously, and has caused a certain amount of concern (Walker *et alii*, 1960). However, it was not associated with clinical acidosis in any case in this series, and was not severe enough to warrant cessation of treatment.

No examples of renal, hepatic or haematological toxic effects have yet been reported, and none were encountered in this series.

Hypoglycaemic reactions occurred only in those patients taking D.B.I. together with insulin. In all instances they occurred during the phase of adjustment, when the insulin dose was being lowered, and none was severe.

#### Discussion.

Because of the high incidence (30%) of gastro-intestinal side-effects, D.B.I. is not as satisfactory as the sulphonylureas as the sole agent in the treatment of diabetes when oral therapy is considered. When these side-effects do not occur, the diabetic control established by D.B.I. is as good as that obtained by the sulphonylureas. The absence of severe toxic effects, and of severe hypoglycaemic reactions, such as have occasionally been observed with chlorpropamide, are points in favour of D.B.I., but they are outweighed by its gastro-intestinal effects.

It appears, from the present results, that the major use of D.B.I. will be in combination with a sulphonylurea or with insulin. Secondary failure to tolbutamide is being observed with greater frequency, and cases of secondary failure to chlorpropamide are now occurring. Such patients may sometimes be controlled on a combination of either of these substances with D.B.I. (De Lawter *et alii*, 1959; Beaser, 1960). It has been found that the dose of the sulphonylurea should be kept at the previous maximum (usually 1500 mg. per day of tolbutamide and 500 mg. per day of chlorpropamide) and the D.B.I. treatment started with a dose of 25 mg. twice daily, and increased until control is attained. By the use of this

TABLE II.  
Response to Treatment with D.B.I. of Patients in Present Series.

Group.	Number of Cases.	Reason for which Therapy was Discontinued.			Establishment of Good Control.		
		Occurrence of Side-effects.	Establishment of Poor Control.	Other Reasons.	By D.B.I. Alone.	By D.B.I. with Sulphonylureas.	By D.B.I. with Insulin.
I	7	2	2	2	0	1	0
II	10	2	2	0	2	4	0
III	8	3	0	0	0	0	5
IV	7	3	2	0	1	0	1
Total ..	32	10	6	2	3	5	6



TABLE III.  
Results of Treatment with D.B.I. in Present Expanded Series.

Group.	Number of Cases.	Reason for which Treatment was Discontinued.			Establishment of Good Control.		
		Occurrence of Side-effects.	Establishment of Poor Control.	Other Reasons.	By D.B.I. Alone.	By D.B.I. with Sulphonylureas.	By D.B.I. with Insulin.
I	10	2	2	2	3	1	0
II	19	5	4	0	3	7	0
III	14	5	1	0	0	0	8
IV	13	5	2	0	4	0	2
Total	56	17	9	2	10	8	10

combination, many older diabetics may now be spared the inconvenience of insulin injections.

The less frequent, but more dramatic, use of D.B.I. is seen in those diabetics labelled as labile or brittle. These patients are usually juvenile diabetics, with a tendency to rapid swings in blood sugar levels. Their lives are complicated by frequent and severe hypoglycæmic reactions of rapid onset, or by episodes of acidosis and precoma. Previous attempts to smooth their course by the use of high-protein diets, sulphonylurea therapy or cortisone therapy have met with partial or no success. Now the whole pattern of their lives may be changed, and they need no longer be subject to the rapid, severe, hypoglycæmic episodes that formerly were so frequent and distressing. In most instances the insulin dose can be lowered by 20% to 40%, and the dose of D.B.I. can be regulated to the gastric tolerance of the individual. With the introduction of slow-release capsules, it is hoped that the incidence of the gastro-intestinal side-effects will be reduced.

The mode of action of D.B.I. has still to be satisfactorily explained, but certain facts are known. Unlike the sulphonylureas, it can produce its hypoglycæmic effect in the absence of endogenous insulin. It acts as an inhibitor of the aerobic pathway of glucose breakdown in muscle, allowing glucose metabolism to proceed anaerobically to pyruvate and lactate (Symposium Issue, 1960).

#### Summary.

D.B.I. is an orally-active hypoglycæmic agent. Because of the high incidence of gastro-intestinal side-effects, it is not advised as the sole agent in the management of diabetes. When it is combined with tolbutamide or chlorpropamide in cases showing secondary failure of response to either of these drugs, satisfactory control of diabetes may be reestablished. When it is used in combination with insulin in brittle diabetics, smooth control of the condition may be achieved.

The principle of dosage one should observe, in order to minimize gastro-intestinal side-effects is as follows: at first 25 mg. is given twice daily, and the dose is increased by one or two 25 mg. tablets not oftener than every fourth day.

#### Acknowledgements.

I am grateful to Dr. Ewen Downie for permission to study patients under his care, and for his encouragement during the trial. I wish to thank Miss Jean Sharp for secretarial assistance.

The D.B.I. used in the trial was kindly supplied initially by the United States Vitamin and Pharmaceutical Corporation, and later by William R. Warner and Company Limited. D.B.I. is marketed as "Insoral".

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#### Addendum.

Since this paper was submitted for publication, increased experience with D.B.I. has been achieved, and Table II can now be extended to incorporate the latest results. These are shown in Table III.

It will be seen that 56 cases were treated; gastro-intestinal side-effects necessitated the cessation of treatment in slightly less than one-third of these, but with better selection of cases, more patients have been benefited by the use of D.B.I. Some experience has been obtained with a slow-release capsule of D.B.I., and this has considerably reduced the incidence of gastro-intestinal symptoms.

#### LEUCINE-SENSITIVE HYPOGLYCAEMIA: CASE REPORT AND FAMILY STUDY.

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AND

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SINCE Cochrane *et alii* first described leucine-sensitive hypoglycæmia in 1956, it has been estimated that in as many as 60% of cases of infantile spontaneous hypoglycæmia the condition is leucine-sensitive (Cochrane, 1960). Other members of the families of a few of these patients have also been shown to be leucine-sensitive. This report describes a patient with leucine-sensitive hypoglycæmia, his response to treatment and studies of the family.

#### Clinical Record.

A boy, aged 11 months, was admitted to the Royal Alexandra Hospital for Children in November, 1960, because of fits and retardation. At the age of one month he began to have fits characterized by twitching, which lasted 10 to 15 minutes. These occurred several times a week, usually 30 minutes after his noon feed or occasionally during the feed. When he was aged six months, because the fits were still occurring, he was given phenobarbital, which produced no improvement. When he was

aged nine and a half months, the fits became more frequent; they were unrelated to meals. During a two-weeks' stay in another hospital, his motor and mental ability regressed considerably. He became irritable and disinterested in his surroundings, and could no longer sit. He was transferred to the Royal Alexandra Hospital for Children for further study.

During her pregnancy his mother had mild toxæmia. He was born at term after a normal labour and delivery. He was breast-fed until the age of seven months. His development seemed normal until three weeks before his admission to hospital. He sat with support at three months and pulled himself to his feet at about seven months.

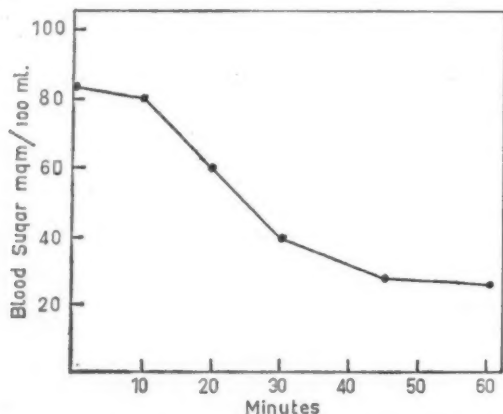


FIGURE I: The effect of the administration of L-leucine (0.15 gramme per kilogram of body weight) on blood sugar levels.

On physical examination he was a well-nourished, floppy boy of 11 months, who showed no interest in people or his surroundings. He was irritable when examined. He followed a light, but could not sit without support and had only fair head control; otherwise physical and neurological examination revealed no abnormality.

Results of a haemogram and a urine examination were normal. The cerebro-spinal fluid sugar level was greater than 30 mg. per 100 ml. and the protein level was 20 mg. per 100 ml. An electroencephalogram showed general slow activity of three to five cycles per second, with no focal features; random blood sugar level estimations ranged between 35 and 46 mg. per 100 ml. A L-leucine tolerance test revealed the following blood sugar levels: fasting, 83 mg. per 100 ml.; at 30 minutes, 96 mg. per 100 ml.; at one hour, 91 mg. per 100 ml.; at two hours, 105 mg. per 100 ml.; at three hours, 78 mg. per 100 ml.; at four hours 30 minutes, 64 mg. per 100 ml.; at five hours, 74 mg. per 100 ml. During a leucine tolerance test (Figure I) no changes in the patient were seen.

After a control period during which blood sugar levels were estimated throughout the day with the patient on a regular diet, the change in blood sugar levels in response to 10 grammes of glucose given 20 minutes after meals was determined. Before treatment was started he had three generalized fits. Blood sugar levels during two of these were 46 and 40 mg. per 100 ml. Then both supplemental glucose and prednisone (2.5 mg. at 7 a.m. and 1 p.m.) were given. This combination seemed to maintain a higher level of blood sugar (Table I and A, B and C in Figure II). When glucose supplements were commenced the patient's milk was changed to a proprietary powdered milk formula ("S.M.A."-Wyeth), which contains only half as much leucine as cow's milk, that is, 157 mg. compared with 356 mg. per 100 ml. (Mabry, 1960). This has been continued. Within a week of the commencement of treatment, he became much more responsive. One month after the beginning of combined prednisone (2.5 mg. twice

daily) and glucose treatment an electroencephalogram was normal. Two months later the patient continued to show considerable improvement in mental and motor development, but seemed a little slow for his age. He was happy and playful. He could sit, crawl and attempt to pull him-

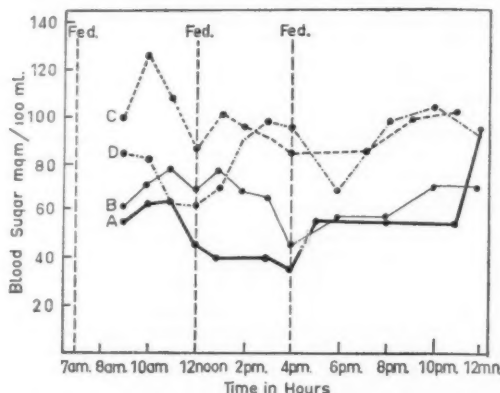


FIGURE II: The effects of diet and prednisone administration on blood sugar levels. A represents the results of a normal diet, with meals at 7 a.m., 12 noon and 4 p.m.; B represents results of a low-leucine diet, plus 10 mg. glucose given 20 minutes after each meal; C represents results of a low-leucine diet and glucose as B, but with added 25 mg. prednisone at 7 a.m. and 1 p.m.; D represents results of a low-leucine diet and glucose as B, but with added 5 mg. prednisone at 6 a.m., 2.5 mg. prednisone at 12 noon and 2.5 mg. prednisone at 6 p.m.

self up. Several days before his discharge from hospital he had two brief fits. His prednisone dosage was increased to 5 mg. and 2.5 mg. daily.

TABLE I.  
Effect of Treatment on Blood Sugar Levels.

Time of Day.	Blood Sugar Levels (mg. per 100 ml.).			
	A. Normal Diet (Meals at 7 a.m., 12 noon and 4 p.m.).	B. Low-leucine Diet plus 10 Grammes of Glucose 20 Minutes after Each Meal.	C. As B plus Prednisone (2.5 mg. given at 7 a.m. and 1 p.m.).	D. As B plus Prednisone (5.0, 2.5 and 2.5 mg. given at 6 a.m., 12 noon and 6 p.m.).
9 a.m.	55	61	99	84
10 a.m.	60	71	121	82
11 a.m.	62	77	108	62
12 noon	46	68	84	62
1 p.m.	40	77	102	67
2 p.m.	40	68	95	89
3 p.m.	40	66	91	98
4 p.m.	35	44	85	96
5.30 p.m.	56	—	—	—
6 p.m.	—	57	—	69
7 p.m.	—	—	85	—
8 p.m.	56	57	—	97
9 p.m.	—	—	99	—
10 p.m.	—	71	—	104
11 p.m.	55	—	103	—
12 midnight	96	71	—	92

One month after his discharge (at the age of 15 months) he was readmitted to hospital because of two fits lasting 20 minutes each. His mental status had not deteriorated. There were no features of side-effects from steroids. Blood sugar levels throughout the day were satisfactory (D in Figure II).

An electroencephalogram was again normal. He was discharged on the same regime of treatment after 10 days in hospital.

#### Family Studies.

The patient's mother had a history of fits occurring between the ages of one year and one and a half years.

She had had no fits since and appeared to be of average intelligence. There were five siblings; the two oldest, a boy, aged eight years, and a girl, aged six years, were by the mother's first marriage. They had had no fits. The youngest four children, including the patient, were by a second husband. He had no history of fits and was not available to be tested. The patient's sister, aged four and a half years, had had three convulsions between the ages of two and three months, but had had none since; she appeared to be of average intelligence. A sister, aged three years, was adopted at birth; no history was available and she was not available to be tested. A sister, aged two and a half years, had no history of fits.

The patient's mother and four available siblings all had no significant fall in their blood sugar levels during leucine tolerance tests in which 150 mg. per kilogram of body weight of L-leucine were given orally.

#### Discussion.

This patient presents a typical course of untreated idiopathic hypoglycaemia, with fits and progressive retardation. He illustrates the fact that afebrile fits in young children can be, and often are, metabolic in origin.

The best way to confirm a suspicion of idiopathic hypoglycaemia is to perform several random blood sugar level estimations, for the blood sugar level may vary throughout the day (A in Figure II), and has no absolute correlation with symptoms—for example, the patient had blood sugar levels of 40 and 46 mg. per 100 ml. during fits, but no symptoms with a blood sugar level of 26 mg. per 100 ml. during the leucine tolerance test. If hypoglycaemia is demonstrated a leucine tolerance test should be performed.

Cochrane (1960) holds that the most important part of treatment in leucine-sensitive hypoglycaemia is the provision of glucose supplements after meals. Steroid therapy may be of some additional benefit in maintaining the blood sugar level. Recent case reports by Haworth and Coodin (1960) demonstrate that steroids are sometimes disappointing. The combination of these measures seems to offer the best chance of maintaining the blood sugar level, but it may not completely control symptoms.

Family studies have shown that some members who are asymptomatic can be leucine sensitive, thus suggesting a hereditary mechanism (Cochrane, 1956). The members tested in this family were not sensitive.

#### Summary.

A case of leucine-sensitive hypoglycaemia is described.

#### Acknowledgements.

We wish to thank Dr. D. G. Hamilton and Professor T. Stapleton for their help.

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### Reviews.

**Key and Conwell's Management of Fractures, Dislocations and Sprains.** By H. Earle Conwell, M.D., F.A.C.S., and Fred C. Reynolds, M.D.; seventh edition; 1961. St. Louis: The C. V. Mosby Company; Sydney: W. Ramsay (Surgical) N.S.W. Ltd. 9 1/2" x 6 1/2", pp. 1154 with many illustrations. Price: £14 7s.

ALTHOUGH the preface states that it is not the authors' purpose to present an encyclopedia of injuries and their treatment, this 1150-page text could hardly be described otherwise. Practically every possible fracture is described under the heading of mechanism, pathology, diagnosis and treatment, all in considerable detail at the expense of some repetition. Thirteen pages are devoted to fractures of the clavicle, and a similar number to fractures of the shaft of the humerus.

The recommendations for treatment on the whole are thoughtful and follow sound conservative practice, although there are some curious anomalies. It is unusual in a modern text to find padded wooden splints preferred to plaster casts for fractures of the forearm, and equally unusual to find recommended the extensive use of skeletal traction for upper-limb fractures. Most surgeons of experience would prefer intramedullary fixation to plates and screws in the treatment of those fractures in which this is applicable, and the use of wire loops and drilling for non-union surely belongs to another era.

The chapter on hand injuries is particularly useful especially the section dealing with fractures of the fingers, and much thought has obviously been given to improving the functional results when the articular surfaces are involved.

Additions to this edition include the use of the hip prosthesis, and the detailed treatment, including operative technique, of spinal disc protrusion.

The book is extensively illustrated with adequately reproduced radiographs, many of which are of considerable interest. Many of the illustrations carry four or five arrows, the purpose of which is not always apparent. In an age in which the volume of material heavily outweighs the time available for reading, one cannot help feeling that this volume would be vastly improved by condensation to half size.

**The Surgical Treatment of Intracranial Meningiomas.** By C. S. MacCarty, B.A., M.D., M.S., in Neurologic Surgery; 1961. Springfield, Illinois: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 70, with illustrations. Price: 36s. (English).

THIS is a delightful little book, beautifully produced and with beautiful illustrations, which indicate well the advantage which an artist's drawings have over photography for the demonstration of certain technical processes. Its value is principally for the younger neurosurgeon, who should certainly read it.

Every now and again a meningioma is encountered which is unusually situated or has had unusual effects, creating a new surgical problem in the operating theatre. The experienced surgeon is as a rule able to deal with the situation; but there can be no doubt that there must be an advantage in having read a book which reports such a case. This little book includes almost every imaginable sort of meningioma, and deals with the subject briefly, clearly and very surgically.

**Mental Retardation in Infants and Children.** By Abraham Levinson, M.D., and John A. Bigler, M.D.; 1960. Chicago: The Year Book Publishers Inc. Melbourne: W. Ramsay (Surgical) Ltd. 9" x 5 1/2", pp. 308, with illustrations. Price: £4 8s.

THIS book has been "written by practising pediatricians for all practising physicians", as the preface explains. Many books on this subject are written from institutions for defectives; but this one is orientated toward examination and assessment of the subnormal child from the consulting room.

The social rehabilitation of subnormal children is dealt with in this book, and the chapter on the counselling of parents is particularly sound. Some of the principles are very wise. The authors point out that the parents of a subnormal child should be told the truth, though the blow can be softened in various ways. Many parents feel guilty, and one of the first things to do is to make them understand that they are not to blame for the child's condition. They can be helped to accept their lot and not to look for miracles, but to avail themselves of the medical and educational facilities available. It is pointed out that much more education and training can be done from the child's own home than is generally realized, and the physician should be in a position to advise the parents on this. The retarded child needs the companionship of his brothers and sisters and the love of his father and mother; so the correct place for the subnormal child is in his own home if it is



practicable. However, in cases of severe retardation or because of the domestic situation, the child may be better off in an institution. The authors wisely adopt the attitude that each case must be assessed on its merits.

In this book there are very short descriptions of the relevant anatomical and physiological facts, a brief review of early development and a chapter on aetiology and classification. The sections on history-taking, the physical examination and laboratory investigations are more detailed and very useful. The evaluation of speech and hearing is very important and is given a section as well. The precise diagnosis and a reasonably accurate prognosis are essential from the parents' point of view. They will want to know what the future has in store for their child. There are sections to help the practitioner with this problem, and there are also sections on medical treatment and on education. The section on prophylaxis should be read by all family doctors. Short but adequate accounts for the family doctor on the various types of mental deficiency are given. There is a leaning towards neurology and paediatrics rather than "institutional mental deficiency". On the whole the book is a valuable one, particularly for the paediatrician and family doctor.

**The Treatment of Hypertension.** By Sir George W. Pickering, M.A., M.D., F.R.C.P., F.R.S., W. I. Cranston, M.D., M.R.C.P., and Michael A. Pears, M.D., M.R.C.P.; 1961. Springfield, Illinois: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 176, with illustrations. Price: 66s. (English).

THIS excellent little book has, in the words of the authors, "provided an opportunity to try to reconcile the antithesis between the science and the art of medicine". High blood pressure is still an ill-defined and poorly-understood disorder, which is so complex that it is yielding its secrets only slowly to clinical science. At the same time, chemotherapeutic agents have appeared which have brought relief and promise of better things for patients with high blood pressure. Although sharply divided in their attitude to prime causes, physicians are at one in utilizing these new drugs in a manner most likely to solve the problem which each patient presents.

In this volume the authors present briefly the concept of hypertension which Sir George Pickering has developed previously, and discuss briefly the untoward effects of high blood pressure and methods of assessing therapy. They then consider the older, little-used methods of treatment, such as sympathectomy, adrenalectomy and salt-poor diet, and devote the bulk of the book to modern chemotherapy. There are clear accounts of the actions of these drugs and their mode of use. The indications for treatment and the management recommended for hypertensive patients accord with established practice; indeed, there are very few surprises for physicians experienced in this field.

This book is presumably written for the practitioner, and yet the undergraduate with heavy demands on his time could do much worse with a week-end than spend it reading this book. He would certainly acquire much that would be valuable to him in his attitude to the drugs yet undiscovered which he will have to use long after he has left medical school. There are rather too many minor typographical errors for a book of such quality. However, we have no hesitation in strongly recommending this book.

**The Surgery of Mitral Stenosis.** By Robert P. Glover, M.D., M.S. (Surg.), F.A.C.S., F.A.C.C., and Julio C. Davila, M.D., F.A.C.S., F.A.C.C.; 1961. New York, London: Grune & Stratton, Inc. 9" x 6", pp. 232, with illustrations. Price: \$9.50.

THIS book, one of the Modern Surgical Monograph Series, covers the whole subject of the surgery of mitral stenosis in a most thorough and fair way. After a gracious tribute has been paid to Sir Henry Souttar, the history of the development of the operation of mitral valvotomy is given in detail, culminating in its successful reintroduction by Bailey, Glover and O'Neill, and independently by Brock, in 1948. This year was a landmark in the history of surgery, for the operation is undoubtedly the greatest surgical advance since the war, and has led to a complete revolution in cardiology which is still continuing.

With their huge experience of cases of mitral stenosis, the authors are able to equate success of surgery with the severity of pathological changes in the valve, and with the clinical stages of the disease. Step by step the mortality rate of the operation has been reduced almost to zero, except in the most advanced cases. The chapter on the anatomy

and pathology of the mitral valve is excellent, and is the key to a proper understanding of surgical procedures on the valve. The illustrations in this chapter are well chosen to emphasize the most important aspects of the disease.

In one respect only does the book differ from the modern opinion. The authors still adhere to the use of a valvulotome introduced through the left atrium. In general this has been superseded by transventricular dilatation according to the method of Logan in those cases in which digital dilatation of the valve is not easily achieved.

The book is recommended not only to cardiac surgeons, but also to physicians dealing with the selection of patients for cardiac surgery; also it has a great value as a book of reference.

The book ends with a thoughtful chapter on the future of mitral valve surgery and an analysis of the part to be played by open-heart techniques and valve prostheses. The opinion is expressed that many patients will always be best treated by the simpler methods practised today.

**The Clinical Application of Antibiotics: Volume II: Streptomycin and Other Antibiotics Active against Tuberculosis.** By M. E. Florey, M.D.; 1961. London and Melbourne: Oxford University Press. 9½" x 6", pp. 336, with illustrations. Price: 121s. (English).

THIS publication is the last volume of four, the others dealing with penicillin (Volume I), chloramphenicol and the tetracyclines (Volume III) and erythromycin and other antibiotics (Volume IV). Many doctors will appreciate the presentation of the use of streptomycin, which is very fully discussed. Considerable detail is available on dosage and period of treatment of tuberculosis. As streptomycin is one of the most toxic drugs in common use, the side effects are enumerated. These include deafness and vestibular dysfunction which can follow a short course of treatment, especially if a daily dose of 2 grammes or more is used. These complications are rare if the daily dose is less than 15 mg. per kilogram (900 mg. for a man weighing 60 kg.). However, there is no dose which is entirely free from these disturbances in some patients. Streptomycin also has a place in the treatment of brucellosis, and of Salmonella and Shigella infections.

Other drugs occasionally considered in the treatment of tuberculosis are viomycin, neomycin, cycloserine, streptovaricin and kanamycin, and these are fully discussed.

Isoniazid is correctly emphasized as the most important ancillary drug to streptomycin in the treatment of tuberculosis, in a dose of 5 to 10 mg. per kilogram of body weight per day. Perhaps isoniazid is the most effective drug, and certainly it may be used alone in the treatment of the primary lesion.

The drug treatment of all forms of tuberculosis is thoroughly documented, and this discussion makes interesting reading.

This series of books are classic reference books on the subject of the clinical application of antibiotics. An important bibliography is provided.

## Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Medicinal Chemistry, Volume I: A Series of Reviews Prepared under the Auspices of the Division of Medicinal Chemistry of the American Chemical Society," by Warren J. Closs, Leonard Doub and Marvin A. Spielman, edited by Walter H. Hartung; 1961. New York, London: John Wiley and Sons Inc. 9" x 5½", pp. 440, with illustrations. Price not stated.

"The British Medical Dictionary," edited by Sir Arthur Salusbury MacNalty, K.C.B., M.A., M.D. Oxon., F.R.C.P., F.R.C.S.; 1961. London, New York, Melbourne, Toronto, Wellington: The Caxton Publishing Company Limited. 11" x 8", pp. 1680. Price: £15 15s.

"Essentials of Cardiology," by S. G. Owen, M.D. (Durh.), M.R.C.P. (Lond.), and J. Vallance-Owen, M.A., M.D. (Cantab.), M.R.C.P. (Lond.); 1961. London: Lloyd-Luke (Medical Books) Ltd. 8½" x 5½", pp. 216. Price: 25s. (English).

"A New System of Anatomy," by Sir Solly Zuckerman, C.B., M.A., M.D., D.Sc., F.R.S.; 1961. London, New York, Toronto: Oxford University Press. 11" x 8½", pp. 534 with illustrations. Price: 108s.

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# The Medical Journal of Australia

SATURDAY, DECEMBER 30, 1961.

## ... YIELDING PLACE TO NEW.

TOMORROW the old year dies, and in the early minutes of Monday morning the lusty wail of a newborn year will announce the arrival of 1962. As always, we shall leave the old year behind with mixed feelings, but however much we may look back, we are free to move only forward. In that sense we must progress, and with our onward movement change is inevitable. More particularly in our bustling, commercialized, competitive modern world what is described as progress has become almost an obsession. We are not content to mould and be moulded by the orderly course of events, but feel obliged to force progress, to regiment life and to cultivate complexity with ever-increasing *tempo*. Blindly and stupidly we far too often assume that the new must be better than the old, and that manipulated change is positive and constructive progress. Perhaps this is natural, and, in so far as it is born of dissatisfaction with the imperfection of man and his achievements, it is defensible and even commendable. Browning's lines are apposite:

Progress, man's distinctive mark alone,  
Not God's, and not the beast's;  
God is, they are,  
Man partly is, and wholly hopes to be.

If the urge for progress remains blind, it can be rewarded by futility and loss. But if it issues in a critical striving for the better rather than for the merely new, it is surely a powerful force to be prized. In particular it will encourage us to preserve and use the best from the past while we explore the future with seeing eyes.

A good deal of this is perhaps platitude, yet it bears restating and rethinking. It is inescapably relevant to our age. There have been many critical periods in man's history when the sense of change has dominated his thinking, as a challenge, as an encouragement or as a threat. But perhaps at no other time than our own would it have been so near to the truth for an educationalist to say, as Arnold B. Grobman has said,<sup>1</sup> that the fact of rapid change in our world is about all we can safely promise our young people. He then quotes President Julius Stratton, of the Massachusetts Institute of Technology: "The world into which we were born is gone; we have little or no idea of the world into which our children may grow to maturity. It is this rate of change, even more than the change itself, that I see as the dominant fact of our time." And it will become more

and not less dominant in the immediately future years if Graham is right in stating that our real knowledge seems to be doubling every 10 years and the next generation can well anticipate an acceleration of this rate of change.

This is in some ways frightening: yet it offers magnificent opportunity. True, every period of history has offered this to those who would accept it. "But", writes Caryl P. Haskins,<sup>2</sup> "in no earlier society can the challenge to acuity of comprehension, to specialized skill, to generalized insight, to the fullest development of individual capability in every field, have been remotely so imperative, nor can the demand and the opportunity for individual development have approached those of our own day. Ours is surely an age in which the stimulus, the demand, and the opportunities for innovation, for individual creativeness, have reached unprecedented heights." To an extent this is good, but it places great strain on man and his resources. Haskins goes on to point out that, for nations as for men, times of unusual stress and challenge are a supreme test, not alone of effectiveness in action, but primarily of inner cohesion and verve, of inner wholeness. "However severe the practical challenge", he says, "it can be successfully met by a people only in its own characteristic fashion, consonant with its own most deeply held values. The whole strength, the whole balance, of a nation must rest on how far what it does undergirds those values. Whenever a mode of life, however outwardly successful, inwardly leads to distrust or denial of them, the radiance of an age of greatness can be quickly dimmed." This has happened in the past, and it can happen to us. No immediate success or difficulty, no practical achievement or mortal threat, should make us lose sight of ultimate values. If as we are hurtled into an ever-changing future we are to strive for what matters in the distant scene, we do well to remain aware of what has mattered in the past. Haskins sees three anchor points standing out with special prominence in the philosophy of American society. The first is a primary dedication to the individual and to his creativeness, the second is a basically religious culture, and the third is a deep respect for, and concern with, both learning and innovation, and perhaps especially the exploration of nature. These are solid things, material for both sound base and enduring building in the progress of a nation. They are undoubtedly also important elements in our own national background, and this is not surprising since Australia and America have branched from the same ancient oak. Stemming from the main trunk at a different time and in different circumstances, warmed and washed to some extent by other suns and showers, we have developed and express ourselves in our own way. But the same stream of sap runs in our veins. It is therefore nothing to be surprised at, or to be ashamed of, that similar values in us seek to bud and blossom and fruit. We do well to let them have their way. And medicine not least of the many elements in our national life will be enriched.

Here, in this respect for the values that we have learned to know in the past, would seem to lie what we need to

<sup>1</sup> *J. med. Educ.*, 1961, 36:1253 (October).

<sup>2</sup> "The Report of the President of the Carnegie Institution of Washington, 1958-1959": 4.

keep bewildering progress in perspective and to hold the rein on the restlessness of change. New medical and surgical skills, potent drug innovations, deeper probings of the human mind, all will serve their purpose better if their use is conditioned always by acknowledgement of the sanctity of life and the respect due to human personality. Medico-political activities and professional relationships with one another demand continued integrity and consideration for others if they are not to recoil on us to our hurt. Our venture into an Australian Medical Association in the coming year will succeed only as we acknowledge the heritage that we have from the British Medical Association, not to lament our independence but to take to ourselves as an adult association values that we have learnt in dependent days. Holding to such anchors as these we need not fear the swift stream of change, however much it may bewilder us and however much we need to respect its power. Indeed, though the shallow pursuit of novelty may achieve only bitterness or the taste of ashes, there is intrinsic virtue and meaning to be found in change *per se*. Washington Irving's expression of it is homely:

There is a certain relief in change, even though it be from bad to worse; as I have found in travelling in a stage-coach, that it is often a comfort to shift one's position and be bruised in a new place.

Speaking through the lips of the dying King Arthur, Tennyson is more fundamental:

The old order changeth, yielding place to new,  
And God fulfils Himself in many ways,  
Lest one good custom should corrupt the world.

## Comments and Abstracts.

### THOUGHT REFORM AND THE PSYCHOLOGY OF TOTALISM.

AFTER the spate of confused and distorted reports about China of the last ten years, it is a welcome change to read a study by such an eminent psychiatrist as R. J. Lifton<sup>1</sup> on one of the most controversial, interesting and elusive features of its government's activities. After military experience as a psychiatrist in the Korean war, Lifton spent nearly two years in Hong Kong on clinical interviews with two series of subjects, 25 Westerners and 15 Chinese intellectuals, all of whom had been through the process of "brainwashing" on the mainland. He spent an average of 15 to 20 hours each with the Westerners, each of whom had just been released from prison and was on his way home, but he spent much longer with the Chinese, most of whom had settled in Hong Kong. It is on the sound basis of this thorough and exhaustive clinical work that his study is founded, and three-quarters of the book is devoted to extracts from the histories obtained and a discussion of their significance. One cannot fail to recognize the objectivity of Dr. Lifton's reports, showing every aspect of his subjects' experience, his penetrating and masterly handling of it, and his perseverance and thoroughness in personally following up later developments in some of the Westerners in their own countries.

Lifton describes vividly the techniques of processing the Westerners in prison (for from one to five years), some of them very severe, and discusses the result of this treatment on them and the principles involved. These, like their Russian counterparts, were penal pro-

cedures to correct their "criminal" attitudes, after which they were released and repatriated. The courses for the Chinese intellectuals, on the other hand, were for a different purpose. They were much milder, were often sought by the subjects themselves and were carried out not in prisons but often in "revolutionary universities". "What we see as a series of coercive measures", Lifton comments, "the Chinese Communists view as a morally uplifting, harmonising and scientifically therapeutic experience."

Obviously Lifton's Chinese subjects provide samples only of the system's failures. But in the vast majority of those that it has reconditioned it has succeeded in integrating and establishing these scholar gentry in the new way of life in the higher ranks of industry and the civil service, as Professor Fitzgerald has confirmed from his own personal observation in Peking. Lifton shows from records of the short period in 1956 of "letting a hundred flowers bloom" that there was widespread though unsuspected strong suppressed resentment and rebellion against the system in the minds of many. He speculates whether it may take the advent of another generation to eliminate this ambivalence. On the other hand, it is indubitable that among these civil servants, and among the million or so of ex-feudal landlords who are now quietly earning their living side by side with their former serfs, there must be a large number who, in the shock of losing everything, have undergone Sargant's "transmarginal inhibition", and so achieved a completely new personality.

In the remaining chapters of the book Lifton makes a philosophical review and reassessment of this system of thought reform in all its aspects, and in the light of four years of wide literary research. It is this section of the book that, with all its repercussions, will be of most interest to many readers. Here he is more than an acute and able observer: he is a constructive and imaginative thinker. He shows the system's features that are derived from its Russian prototype, especially its insistence on the experience and expression of devastating guilt, an attitude quite foreign to Chinese culture. But he also points out how readily it was grafted on to the Chinese traditional faith in the power of persuasion to reform men. Loyalty to the new regime gains added strength as a sublimation of classical filial piety. The all-embracing totalitarianism of communism is comparable with that of imperial Confucianism. His exposition of "ideological totalitarianism" and its "religious" fervour within the closed system of communist thought and environment is impressive, suffocating and formidable; and yet he finds definite danger and traces of it in the religious, educational, political and psychiatric systems of the West. He concludes a sombre book with a suggestion of hope: "In studying thought reform . . . I have been . . . equally impressed with man's ingenuity in breaking out of that circle, with his physical and emotional resiliency and with the extraordinary scope of his emotional faculties at moments when he feels his existence threatened."

### THE HEALTH OF THE AGED.

An investigation into the health of 3149 aged persons in the Netherlands and into a number of related social and psychological factors has been carried out since 1955 by 374 general practitioners, under the direction of the Organization for Health Research, T.N.O. The results are published in a monograph by R. J. van Zonneveld,<sup>1</sup> which will be of considerable interest to a variety of readers. It falls into three main parts. The first part, which describes the objectives, planning, pilot studies

<sup>1</sup>"Thought Reform: A Psychiatric Study of Brainwashing in China", by R. J. Lifton, M.D.; 1961. London: Victor Gollancz Ltd. 8½" x 5½", pp. 610. Price: 42s. 3d.

<sup>1</sup>"The Health of the Aged: An Investigation into the Health and a Number of Social and Psychological Factors Concerning 3149 Aged Persons in The Netherlands, Carried out by 374 General Practitioners under the Direction of the Organization for Health Research T.N.O.", by R. J. van Zonneveld, M.D.; 1961. Assen: Van Gorcum & Comp. N.V. Dr. H. J. Prakke & H. M. G. Prakke. 9½" x 6½", pp. 440. Price: f 22.50.



and organization of the study, will be of interest to those concerned in the planning of any large-scale sociological or psychological study, particularly when conducted through the medium of general practitioners.

The main part of the monograph contains graphic presentation of various parameters studied. These include family history, past and present personal history, adjustment to environment and aging processes, whether or not the subjects studied considered themselves as ill, result of detailed physical examination, including rectal and vaginal examination, hemoglobin estimation and determination of erythrocyte sedimentation rate. These results are tabulated in detail by various age groups from 65 through to 84 years of age and over. They should be consulted in detail in the monograph by those interested in geriatric studies.

The third part is a summary with 32 deductions. There was little found to substantiate the traditional view that heredity is a factor in longevity. Approximately 50% of the group studied had been under observation periodically by their own doctors. In spite of this, 30% were found to have abnormalities which had not been previously disclosed. In 6% these were of a serious nature. They were mainly confined to cardiac abnormalities, but many were found only by rectal and vaginal examination, which would not normally have been carried out apart from this particular study. The lesson to be learned from this is the importance of the periodical conduct of full health examinations in the elderly. Among the more important socio-psychological findings was the fact that the majority of people studied appeared to be "well-adjusted" to their aging process. Few appeared to be "bored". Defects in hearing, eyesight and dental status appeared to be of considerable importance. An interesting finding was the relatively high incidence of diastolic hypertension. This did not appear to have any correlation with smoking habits.

It is apparent that there is a large field open for research into the apparently normal geriatric subject. One of the interesting features of this study was that it was conducted entirely by general practitioners, who above all have the confidence of, as well as the access to, their patients. In spite of many problems in initial organization, the full-scale survey was conducted without any undue difficulty, thanks to the careful pilot stage.

#### FRANCIS BACON.

FRANCIS BACON, Lord Verulam, was born in 1561, and though he was neither physician nor surgeon, it would be remiss of us to let the quadricentennial pass unnoticed. One of the most notable of Englishmen, Francis Bacon has yet been one of the most denigrated, and the judgement of history on his personal and political activities is still equivocal—"so much glory and so much shame", says Macaulay. Few, however, question his place as a forerunner of modern science, and in this rôle he holds medicine in his debt. He made no practical contribution to the experimental science which he advocated; as Douglas Guthrie<sup>1</sup> puts it, the legal training of a Lord Chancellor, which admitted of no imagination, was not the best preparation for a scientist. His part, in his own often quoted words, was to ring the bell which called the wits together. "He was", writes René Dubos,<sup>2</sup> "but the eloquent voice of the many forces that converted Europe from the scholastic acceptance characteristic of the Middle Ages to the dynamic attitude associated with the Renaissance and the Reformation." Nevertheless, "he had a creative influence . . . through helping Europeans to realize the social power of science", and both early members of the Royal Society and the French Encyclopedists acknowledged their indebtedness to him. This is Dubos's summing up: "Bacon symbolizes, even though he

obviously did not initiate, a very profound change in the attitude of man towards knowledge. In the past, science had been primarily concerned with the search for law and order. It was theoretical rather than practical—an adornment of life. After Bacon, knowledge increasingly became an instrument to achieve mastery over nature."

It was not for a long time after Bacon's day that the scientific approach found any great place in medicine, but then the attitude that he fostered became palpably important. In this he is significant for modern medical science. His own knowledge of medicine is of no practical significance to us today, but it was remarkable for a non-medical man within the limits of contemporary knowledge. G. W. Steeves presented a paper on "Medical Allusions in the Writings of Francis Bacon" to the Section of the History of Medicine of the Royal Society of Medicine in 1913 (with Sir William Osler in the chair). This occupied 20 pages in print,<sup>3</sup> though Steeves described it as "only a hasty résumé" of the allusions. Apart from the light that it throws on medicine and its practitioners in the late sixteenth and early seventeenth centuries as seen by an inquiring layman, it provides ample evidence of the keen mind and encyclopaedic knowledge of the man whom Pope called "the wisest, brightest, meanest of mankind".

#### QUARANTINABLE DISEASES.

A WORLD HEALTH ORGANIZATION report on the frequency of quarantinable diseases in the world (from 1957 to the first six months of 1961) shows a retreat of plague and smallpox, and a slight increase of cholera. In 1960, the total number of cases of plague reported all over the world did not exceed 360; figures from India are particularly significant with an average yearly death rate of 548,427 between 1898 and 1908, as against 19 for 1959-1960. According to official reports there was a rapid decrease in the incidence of smallpox in the past 10 years; 489,000 cases were recorded all over the world in 1951—a particularly bad year for smallpox—as against 60,000 in 1960. In 1960, cholera appeared outside its traditional breeding grounds in India and East Pakistan, moving north to Jammu and Kashmir, west to West Pakistan and Afghanistan, and east to Burma. During the first half of 1961 there was a rather serious recrudescence of the disease in West Bengal (1422 deaths), and recently there was an epidemic in Calcutta.

#### SHORTER ABSTRACTS.

##### ORTHOPÆDIC SURGERY.

EWING'S SARCOMA: A CRITICAL ANALYSIS OF 165 CASES. D. C. Dahlin *et alii*, *J. Bone Jt Surg.*, 1961, 43A: 185-192 (March).

IN presenting a review of 165 cases of Ewing's sarcoma, from the records of patients treated at the Mayo Clinic between 1905 and 1960, the authors state that the nature of the parent cell is still in marked dispute, that the radiological appearance, formerly considered to be relatively pathognomonic, is now known to be extremely variable and not specific, and that the pathologist's views on Ewing's tumour are somewhat different from what they were in the past. Each case has been reviewed histologically by one of the authors, and the records, radiographs (when available) and follow-up data have been reviewed by all three authors. They define Ewing's tumour as a highly anaplastic malignant small round-cell tumour, clinically primary in bone. Diagnosis can only be made histologically. It is now possible to distinguish it from metastatic tumours, leukemic infiltrates, various malignant lymphomas, myeloma, eosinophil granuloma and even some small-cell osteogenic sarcomas. In the series the lesion was predominantly found in males less than 30 years old, but it did occur in all age groups. The authors have analysed the various treatments, and

<sup>1</sup>"A History of Medicine", 1946, Nelson, London: 177.

<sup>2</sup>*Science*, 1961, 133: 1207 (April 21).

<sup>3</sup>*Proc. roy. Soc. Med.*, 1912-1913, 6 (Sect. Hist. Med.): 76.

despite changing methods in the period under review, consider that amputation was better than irradiation. Although few of the lesions were treated by modern cobalt therapy, they consider that there is no definite indication of its superiority to the older erythema-dose methods of irradiation. They conclude that this is an extremely malignant and rapidly fatal condition, whatever treatment is employed.

**ACUTE ARTERIAL INJURIES DUE TO BLUNT TRAUMA.** H. Collins and J. K. Jacobs, *J. Bone Jt Surg.*, 1961, 43A: 193-196 (March).

The authors report the common occurrence of ischaemia due to arterial and venous damage by blunt trauma. The common associated injuries are fractures or dislocations. Visceral arteries may be injured, with consequent thrombosis, by the pull of a viscus on its pedicle. The authors state that expectant therapy has no place. Aggressive surgery with excision and resuture, or failing this autogenous venous grafting, or synthetic replacement, can give early return of circulation. Spasm is rarely the cause of a cool, pallid hypaesthetic extremity. Pressure from a cast can be checked easily by removing the cast. Displaced fragments may cause pressure but this will be relieved by reduction. Exploratory operation is always a lesser risk than the possible development of gangrene. The authors use arteriography in the theatre, but not as a routine. They consider that sympathectomy is overrated.

**THE DEVELOPMENTAL ORIGIN OF SPONDYLOLISTHESIS: TWO CASE REPORTS.** L. Cozen, *J. Bone Jt Surg.*, 1961, 43A: 179-184 (March).

The author reports two cases of spondylolisthesis, one in a child who had been treated for congenital dislocation of the hip, the other in a child treated for tuberculosis of a different area of the spine. In both these cases there was no evidence of the condition visible in the earlier pictures. This finding was consistent with late development of an apparent developmental condition. The author discusses the many theories of the causation of this condition.

**OBSERVATIONS ON NON-UNION OF THE SHAFT OF LONG BONES, WITH A STATISTICAL ANALYSIS OF 842 PATIENTS.** H. B. Boyd *et alii*, *J. Bone Jt Surg.*, 1961, 43A: 159-168 (March).

The authors present an analysis of 842 patients treated for non-union of single or multiple fractures. They state that the findings help to confirm principles which are generally held, rather than to present new ideas. They note that the process of bone formation after a fracture is poorly understood. Union demands osteogenesis, contact of bone ends, fixation and, although not essential to ultimate union, compression. The indispensable factor is osteogenesis. This seems best stimulated by autogenous bone grafts. Homogenous grafts have not been shown to cause any antigen-antibody reaction, but the host accepts and utilizes autogenous tissues more easily and rapidly. The factors predisposing to non-union are listed and analysed. Some factors are interlocking in their effect. These are interruption of blood supply, large middle fragments in double fractures, excessive soft-tissue damage, and bone fragmentation and splintering. Other common causes are open fractures, open reduction and internal fixation of both open and closed fractures, and infection. The authors observe that the type of operative procedure made little difference to the result. There was no great preference for one or other method of grafting, whether a sliding graft, or cancellous chips with intramedullary pins, or Phemister graft only, or plates and chips were used.

**ELECTRODIAGNOSIS.** C. B. Wynn Parry, *J. Bone Jt Surg.*, 1961, 43B: 222-236 (May).

The author discusses different methods of electrical testing for peripheral nerve lesions. He notes that Erb's method, first elaborated in 1883 with the use of faradic and galvanic currents, is entirely misleading and should be discarded. Full investigation of peripheral lesions should include the strength duration (S.D.) curve, electromyography (E.M.G.), and where indicated, motor and sensory conduction times. The author describes the technique of S.D. testing; he notes that E.M.G. demands special experience and equipment. The S.D. curve is formed by graphing the current in volts against ten pulse-duration times ranging between 300

and 0.01 millisecons. The test begins with the longest pulse duration which gives a perceptible muscle contraction to the naked eye. These graphs enable the operator to detect normal enervated muscle fibres, completely denervated muscle fibres and, what is important, partially denervated muscle fibres. This test is a quantitative and reliable guide to recovery or degeneration in an injured nerve. The author describes E.M.G. findings in various medical and surgical conditions, including carpal-tunnel compression.

**THE BROKEN SCAPHOID BONE.** P. S. London, *J. Bone Jt Surg.*, 1961, 43B: 237-244 (May).

The author presents a review of the results of treatment of 300 cases of fractured scaphoid. He finds that of the 227 cases followed up, bone union occurred in 95%. The average time of immobilization was eight weeks. Immobilization was in plaster with the wrist moderately dorsiflexed and in ulnar deviation. The thumb was in functional position. The plaster was usually removed when there was clinical relief, even if the X-ray film appeared doubtful. The author considers that non-union is less serious than has been reported by other authors. Trouble appears to arise if the wrist is over-used. Osteoarthritic changes are not inevitable and are likely only after many years of non-union.

**EXCISION OF THE LUNATE BONE IN KEINBÖCK'S DISEASE.** H. S. Gillespie, *J. Bone Jt Surg.*, 1961, 43B: 245-249 (May).

The author has studied the results which followed excision of the lunate bone for Keinböck's disease in 24 cases in which operation was performed between 1935 and 1958. Eleven were Workers' Compensation Board cases, four were military cases and nine were private cases. The changes which occurred in these wrists are described. It is noted that osteoarthritis which was present before operation did not progress subsequently. Other changes were carpal bone shift and cyst formation in the carpal bones or in the ulna. The author lists his criteria for assessment and reports 67% of excellent results. Excision after prolonged symptoms gave disappointing results.

#### PATHOLOGY.

**THE MANAGEMENT OF RECURRENT CARCINOMA OF THE CERVIX FOLLOWING SIMPLE TOTAL HYSTERECTOMY.** W. Daniel and

A. Brunschwig, *Cancer*, 1961, 14: 582-586 (May-June).

This is a report on 78 patients with recurrent cancer of the cervix after simple total panhysterectomy. The authors conclude that standard radical panhysterectomy is not an adequate operation for invasive cancer of the cervix. In this series, limited operations for recurrences afforded five-year salvage in 10 of 12 instances. Of 33 patients having exenterations for extensive recurrences, seven survived free from disease for at least five years. Among the total series of 78 patients with recurrent cervical cancer after simple total panhysterectomy with or without radiation therapy, 42 had such extensive recurrences that no operative procedure could be attempted. The authors recommend prompt surgery as soon as recurrence is detected. They could not assess the value of radiotherapy in these cases because the patients who presented themselves were, for the most part, those in whom radiation had failed to control the recurrences after the initial operations.

**EXFOLIATIVE CYTOLOGY IN ORTHOPEDICS.** A. Meisels and M. Berebichez, *Canad. med. Ass. J.*, 1961, 84: 957-959 (April 29).

The authors state that although aspiration biopsy and histological techniques have been amply used in the diagnosis of bone and joint diseases, to their knowledge the specific methodology of exfoliative cytology has not been applied before in this field, and they report their experience with this technique as applied to orthopaedics. Synovial fluid was examined from 40 patients with bone and joint diseases, 74 joints having been aspirated. In three cases the presence of malignant cells was discovered, and histological examination later confirmed the presence of an osteogenic sarcoma invading the joint. In one case the diagnosis had been unsuspected clinically. The authors give

details of their technique, and state that it is simple in experienced hands and that the diagnosis should present no difficulty to a trained cytologist.

**THE EFFECT OF LONG SURVIVAL ON THE PATHOLOGY OF THALAS-  
SÆMIA MAJOR.** C. L. Witzleben and J. P. Wyatt, *J. Path.  
Bact.*, 1961, 82: 1-12 (July).

The authors describe five cases of thalassemia major with long survival and necropsies in four. There was undoubtedly cirrhosis in all cases. Myocardial degeneration and right ventricular hypertrophy were also constant features. Despite massive siderosis in all cases, in only three was there significant pancreatic fibrosis and in one case relative islet insufficiency was demonstrable by the glucose tolerance curve. Cirrhosis developed late and in a characteristic manner. It appeared to follow the attainment of a critical level of intracellular iron which was derived predominantly from persistently high gut absorption, due to disturbed hematopoiesis. Transfused blood was an important source of parenchymal iron only after splenectomy.

**EXPERIENCES WITH TECHNIQUES OF CHROMATIN SEX DETERMINA-  
TION.** H. S. Grof and H. S. Kupperman, *Amer. J. clin.  
Path.*, 1961, 36: 132-138 (August).

The authors have examined both blood and buccal smears from a large number of patients in order to determine whether the two methods of examination of sex chromatin were comparable. In all cases the results obtained by the buccal smear method were identical with those obtained by the blood smear method. The authors discuss their technical methods and their criteria. They emphasize that reliable results are solely dependent upon specimens of high technical quality and meticulous examination of those specimens. In this way any discrepancy between the two methods will be eliminated unless there is a chromosomal mosaic or a blood chimera, both extremely rare conditions.

**THE GLOMUS TUMOR IN CHILDREN.** E. Kohout and A. P. Stout, *Cancer*, 1961, 14: 555-556 (May-June).

The authors have collected 57 examples of this tumour in children up to 15 years of age. Although the tumours are similar in children and in adults, they are more likely to be multiple, and more likely to be infiltrative in children. Six of the 57 tumours were congenital. As in adults, subungual tumours were more common in girls than in boys but were rare in the first ten years of life. There was no significant association with congenital malformations, apart from the presence of neurofibromatosis in two children. However, two glomus tumours were associated with hæmangiopericytomas. In no case did a glomus tumour in childhood develop into a metastasizing tumour. Similarly, the authors doubt whether any so-called malignant glomus tumour in adults is really a glomus tumour.

**A CLINICOPATHOLOGICAL STUDY OF BENIGN HODGKIN'S DISEASE.** P. J. Dawson and C. V. Harrison, *J. clin. Path.*, 1961, 14: 219-231 (May).

A series of 44 cases of benign Hodgkin's disease is reported. The condition occurs most commonly between the ages of 15 and 35 years and affects men more often than women. The presenting symptom is painless lymphadenopathy, frequently in the neck, and often confined to a single group of nodes. The histological features are the presence of Sternberg-Reed cells. The prognosis is good: 93% of patients survive five years and 85% 10 years. About one-quarter of the patients show transition to classical Hodgkin's disease after a period of five or more years and die with widely disseminated Hodgkin's disease. Biopsy-excision followed by radiotherapy is the treatment of choice.

**CULTURE OF HUMAN CANCERS ON EMBRYONIC CHICKEN KIDNEY  
IN VITRO.** E. Wolff *et alii*, *Presse méd.*, 1961, 69: 1123-1126 (May 24).

The authors present the results of a new method of tissue culture, which makes it possible to cultivate freshly taken pieces of human cancers on embryonic chicken kidney growing *in vitro*. The advantage of this method, which the authors tested on animal tumours before applying it to human tumours, is that it preserves the structure and properties of the tumour masses. This behaviour differs considerably from that of normal or malignant cells cultivated by the classical methods of tissue culture, by which they lose their differentiated and coordinated appearance.

The study finally shows that in certain embryonic organs, and especially in the mesonephros, there are factors greatly favouring tumour growth. The authors insist that their technique, which has previously been described and is now slightly modified, must be followed meticulously.

**GRANULOMAS INDUCED BY SURGICAL LUBRICATING JELLY.** R. J. Reed *et alii*, *Amer. J. clin. Path.*, 1961, 36: 41-48 (July).

This paper deals with five examples of foreign body granulomas resulting from lubricating jelly, which were associated with traumatic urethral instrumentation. In two instances the lubricating jelly was found in pulmonary vessels, and in one widespread pulmonary emboli probably contributed to the patient's death. A retrograde urethrogram on another patient with urethral stricture showed filling of the pelvic veins by contrast medium. This is thought to be the mechanism of embolization by lubricating jelly which is often instilled under pressure.

**AN ASSESSMENT OF THE ANATOMICAL FACTOR IN COR PUL-  
MONALE IN EMPHYSEMA.** M. S. Dunnill, *J. clin. Path.*, 1961, 14: 246-258 (May).

The morbid anatomical factors in the production of right heart hypertrophy and failure in emphysema have been reviewed with reference to 44 cases studied by standard histological methods and by post-mortem pulmonary arteriography. The most important factors in raising the pulmonary vascular resistance in these cases are considered to be vascular deformity and pressure by the emphysematous spaces on the adjacent branches of the pulmonary artery. Precapillary bronchopulmonary arterial anastomoses may be of importance in those cases in which areas of localized bronchiectasis are present. Intimal fibrosis of the pulmonary arterioles, destruction of the pulmonary vascular bed, and thrombo-embolic phenomena were thought to be of only minor importance in the production of cor pulmonale in emphysema.

**HYPERTENSION OF THE PULMONARY CIRCULATION DUE TO  
CONGENITAL GLOMIOID OBSTRUCTION OF THE PULMONARY  
ARTERIES.** E. Moschowitz *et alii*, *Amer. J. Path.*, 1961, 39: 75-94 (July).

The glomoid lesions sometimes seen in pulmonary arteries are believed by the authors to have been the cause of and not the result of pulmonary hypertension in their four cases. Serial sections showed that efferent vessels from the glomoid bodies terminate in pulmonary capillaries. Proximal to the glomoid lesions the vessel is the seat of profound sclerosis which is proportional to the duration of the hypertension. Distal to the lesion, the vessel is essentially normal since the pressure has been neutralized. These lesions are never seen in pulmonary hypertension secondary to acquired disease such as mitral stenosis, and in the majority of cases they occur in association with congenital cardiac defects. These facts suggest a congenital origin.

**SIGNIFICANCE OF MEGAKARYOCYTES IN THE SEARCH FOR TUMOR  
CELLS IN THE PERIPHERAL BLOOD.** J. W. Baker *et alii*, *New  
Engl. J. Med.*, 1960, 263: 993-996 (November 17).

The authors state that it has long been accepted that malignant tumours may invade blood vessels and create showers of tumour emboli. They proceed to recapitulate briefly the history of the search for tumour cells in the blood, noting the results obtained and techniques used by leading investigators in this field. They point out the difficulty of accurate identification of tumour cells by their morphological characteristics, and state that the multiplicity of techniques available and the fact that no one method has been generally accepted emphasize the difficulties encountered by all. After experimenting with several methods, they settled on the technique described by Malgren, because it was hoped that a more complete recovery of tumour cells could be obtained in this fashion.

The authors report the results of an examination of blood samples from 144 patients by this technique. In this series they found only two patients in whose blood tumour cells could be definitely identified. Megakaryocytes were found in specimens from 60 patients (42%) and were mistaken for tumour cells at the beginning of the study. The authors consider that, with mounting interest in the isolation of tumour cells from blood samples, it is important to call attention to the fact that megakaryocytes occur in the circulating blood and can be confusing to the searcher for tumour cells.



## Public Health.

### DIETARY ALLOWANCES FOR AUSTRALIA (1961 REVISION).

THE first Australian table of dietary allowances was issued by the National Health and Medical Research Council in 1954. These allowances were recommended as a basis for the planning of diets in Australia, and represented average values for the groups specified. This table has been reviewed (1961) by a Committee of the National Health and Medical Research Council, and new allowances have been determined for a number of nutrients. Allowances for all nutrients during pregnancy, for protein of all groups and for calcium in infancy and lactation are still under review. Therefore the values for these nutrients have been retained, for the present, as set out in the 1954 table of allowances.

#### Notes on Recommended Allowances.

Dietaries containing a variety of foods commonly eaten in Australia will provide the recommended allowances of the nutrients listed, and should also provide adequate amounts of other nutrients whose nature and functions are less well known.

The allowances are based on the theoretical requirements of the reference adults defined hereunder, and as individuals differ from the reference with respect to age, body size, degree of activity, climatic environment and other factors, so their requirements will differ from those of the reference (Food and Agriculture Organization, 1950). The reference children and adolescents may be considered as the younger counterparts of the reference man and woman; they live in the same climatic environment and they are very active.

Deviations from the recommended allowances of the order of 10% to 15% are not likely to have a significant effect on the nutritional status of different people in the same age and sex group. It is emphasized that although the allowances may be used as an arbitrary standard for the evaluation of diets, the failure of an individual diet to reach the levels of the allowances does not itself justify the conclusion that the diet is inadequate.

#### Reference Man.

The reference man<sup>1</sup> is aged 25 years. He is healthy—that is, he is free from disease and exhibits a "normal" degree

<sup>1</sup> Adapted from definitions given in the report of the Committee on Calorie Requirements, Food and Agriculture Organization of the United Nations (1950).

of physical fitness. He weighs 65 kg. (143 lb.) and lives in the warm temperate zone at a mean external annual temperature of 18° C. (64° F.).<sup>2</sup> He consumes an adequate, well-balanced diet; he neither gains nor loses weight. His activity is exemplified by the following average schedule: on each working day, eight hours of physical work of the type referred below, four hours of "sedentary" activity (for example, reading, writing), a walk of 5 to 10 kilometres (3 to 6 miles) on the level, and at least two hours out of doors; on each working day, the active pursuit of exercise and sport not of the extremely strenuous variety. The degree of activity involved in occupation in light industry or general laboratory work would represent approximately his working activity.

#### Reference Woman.

The reference woman<sup>1</sup> is a similarly healthy woman, aged 25 years, weighing 55 kilograms (121 lb.). She lives in the same environment as the reference man and is engaged in general household duties, including the care of small children, or in light industrial work. Non-working activities include a daily walk from 5 to 10 kilometres (3 to 6 miles) and two hours spent out of doors. At times she engages in activities such as gardening and non-strenuous sports.

#### Calories.

The calorie allowances apply to the reference man and woman already defined. A high percentage of urban dwellers would have a lower degree of activity and therefore lower calorie requirements than those given for the reference man (Hipsley, 1961). Calorie allowances are reduced with increasing age because of the lessening of activity that usually accompanies aging; older persons who do not reduce their activity to the usual level will require to reduce their calorie intake only in proportion to their reduction of activity.

#### Protein.

The 1954 values have, for the present, been retained. Protein allowances are related to body weight, those for adults being computed as 1 gramme per day for each kilogram of body weight. For children the allowances are much greater in relation to size, being 1.5 to 3.0 grammes daily per kilogram of body weight for children and young adolescents, and 3.5 grammes for infants.

It is of no consequence whether the protein allowance is obtained from animal or vegetable foods, provided that an adequate mixture of amino-acids is supplied. In the usual Australian diet pattern, however, a proportion of animal

<sup>2</sup> Computed from mean annual temperatures of all States based on the mean of the daily maximum and minimum.

TABLE I.  
Daily Dietary Allowances, 1961.

Subjects.	Age. (Years.)	Calories.	Protein. (Grammes.)	Iron. (Milli- grammes.)	Calcium. (Grammes.)	Vitamin A Activity. (I.U.). <sup>1</sup>	Thiamine. (Milli- grammes.)	Riboflavin. (Milli- grammes.)	Niacin Equivalents. (Milli- grammes.). <sup>2</sup>	Ascorbic Acid. (Milli- grammes.)
<b>Men:</b>										
Weight 65 kg. (143 lb.)	25	2700	65 <sup>3</sup>	10	0.7	2500	1.1	1.6	18	30
	65	2000	65 <sup>3</sup>	9	0.6	2300	0.8	1.2	13	30
<b>Women:</b>										
Weight 55 kg. (121 lb.)	25	2300	55 <sup>3</sup>	12	0.6	2000	0.9	1.4	15	30
	65	1600	55 <sup>3</sup>	11	0.5	1800	0.6	1.0	11	30
Pregnant (third tri- mester—weight 65 kg.)	—	2600 <sup>3</sup>	80 <sup>3</sup>	14	1.5 <sup>3</sup>	2500 <sup>3</sup>	1.1 <sup>3</sup>	1.8 <sup>3</sup>	16 <sup>3</sup>	80
Lactating	—	3100	100 <sup>3</sup>	17	2.0 <sup>3</sup>	3000	1.2	1.8	20	100
<b>Infants</b>	Under 1	60 to 45 <sup>3</sup> per pound	1.6 <sup>3</sup> per pound	1	0.6 to 1.0 <sup>3</sup>	1700	0.3	0.5	4	30
<b>Boys</b>	Under 3	1200	40 <sup>3</sup>	8	0.3	1200	0.5	1.0	8	30
	7	2100	55 <sup>3</sup>	10	0.4	1600	0.8	1.7	14	30
	11	2600	70 <sup>3</sup>	13	0.5	1700	1.1	2.1	17	30
	14	3100	85 <sup>3</sup>	16	0.7	2500	1.2	2.5	20	30
	16	3500	100 <sup>3</sup>	18	0.8	2900	1.4	2.8	23	30
<b>Girls</b>	Under 3	1300	40 <sup>3</sup>	8	0.3	1100	0.5	1.0	8	30
	7	2100	55 <sup>3</sup>	10	0.4	1500	0.8	1.7	14	30
	11	2400	70 <sup>3</sup>	12	0.5	1900	0.9	1.9	15	30
	14	2600	80 <sup>3</sup>	14	0.6	2000	1.0	2.1	17	30
	16	2500	75 <sup>3</sup>	15	0.6	2300	1.0	2.0	17	30

<sup>1</sup> Three international units of carotene equivalent to one international unit of vitamin A activity.

<sup>2</sup> Niacin equivalents: preformed niacin plus (grammes of protein × 0.16).

<sup>3</sup> Allowances are under review. Pending an acceptable modification, the 1954 allowance has been reproduced in this table.

foods should be included to provide some of the other essential nutrients.

#### Calcium.

Values have been calculated on the basis that the allowance for a man weighing 65 kg. is 650 mg.

#### Iron.

No recommendations for iron were made by the National Health and Medical Research Council in the 1954 table, because the information available regarding iron metabolism did not justify the adoption of any precise values. Since 1954 new data have been published. The suggested probable requirements appear in Table I.

#### Vitamin A.

Vitamin A activity is derived from preformed vitamin A and its precursor carotene. When the vitamin A activity of foods is being computed, the values for carotene (International Units) should be divided by three before being added to the vitamin A (International Units) to give the total "vitamin A activity" in International Units.

#### Thiamine.

Thiamine has been computed on the basis of 0.4 mg. per 1000 Calories.

#### Riboflavin.

A value of 0.6 mg. per 1000 Calories has been used in constructing the scale for adults, and 0.8 mg. per 1000 Calories for children.

#### Niacin.

For mixed diets, a rough approximation is that the protein in the diet contains 1% tryptophan. Some niacin is formed from this tryptophan (60 mg. of tryptophan are equal to 1 mg. of niacin). The niacin equivalent of a diet is computed from dietary niacin plus 0.16 time the dietary protein in grammes, expressed in milligrammes.

#### Ascorbic Acid.

This allowance is unchanged from the 1954 value.

#### References.

- HIPSEY, E. H. (1961), "A Theoretical Assessment of Dietary Requirements", *Food and Nutrition Notes and Reviews*, 18: Nos. 11 and 12 (November and December). Published by the Commonwealth of Australia, Canberra.
- NUTRITION COMMITTEE OF THE NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL (1954), "Recommended Dietary Allowances for Australia", *MED. J. AUST.*, 2: 113.

## British Medical Association.

### SOUTH AUSTRALIAN BRANCH: SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held in March, 1961, at the Memorial Hall, Newland House, Adelaide. The meeting took the form of a clinico-pathological conference. The report is as follows.

DR. R. G. C. DE CRESPIGNY: The meeting tonight represents something of a new departure to this Branch, in that we have arranged for a clinico-pathological discussion. We are most indebted to the Department of Pathology at the University of Adelaide and to Professor Robertson in particular, who have undertaken all the work of organizing this; he will undertake the conduct of this meeting tonight.

#### Case for Diagnosis.

PROFESSOR J. S. ROBERTSON: I am very pleased to be asked to come along here to do this but I feel a bit shy about it. It is not as easy as you might think to turn on these cases. We do some 700 autopsies a year, and we only have about half a dozen, I suppose, which are suitable for this purpose. This is a tribute, I think, to my clinical friends. From our point of view, the ideal case is one of obscure and deep-seated disease with an inaccurate and irrelevant history, a bad physical examination and a maze of quite irrelevant investigations. Fortunately we work in a teaching hospital and the residents are trained by ourselves; therefore, the histories are always completely accurate and to the point and examinations above reproach, and their investigations few and apposite. Without more ado I shall read the first history.

#### Case I.

A woman of 67, whose history was obtained from her husband, had been reasonably well until five days before admission, when she began to get severe epigastric pain which radiated into the back and loins associated with some vomiting. Two hours before admission she developed sudden severe upper abdominal pain, vomiting and semi-consciousness. Her bowels were usually regular, but had not been open for five days. Her appetite had been poor lately. She had had rheumatic fever as a child, and had occasional attacks of nocturnal breathlessness. On examination, she was semi-conscious, and her extremities were cool. She had a mild fever, a rapid pulse, blood pressure 105/65 mm. of mercury, a dry furred tongue, and the jugular venous pressure was raised 3 cm. Her heart rate was rapid and the rhythm irregular. There was a mitral systolic murmur. Broncho-vesicular breathing was heard on the right side of her chest, her abdomen was soft with no mass or tenderness. Her reflexes were normal. Rectal examination showed dark black iron-stained faeces. Investigations gave the following results: haemoglobin value 113%, white cell count 14,000 of which 77% were polymorphs, blood sugar on admission 640 mg. per 100 ml. serum electrolytes—sodium 120, potassium 5.8, chloride 78, carbon dioxide 21, serum amylase 90 units, urine "++++" sugar, moderate acetone.

She was given 0.5 mg. of digoxin, 20 units soluble insulin intramuscularly and saline lactate intravenously. She was reassessed four hours later, and there was no great change in the general condition, although there was abdominal tenderness in the right iliac fossa and absent bowel sounds. She was then given 100 units soluble insulin intramuscularly, and 20 units intravenously. Eight hours later the blood sugar was 43 mg. per 100 ml., her temperature had risen to 102.4° F., and she was obviously failing. She was given 100 ml. of 50% glucose intravenously, with improvement in her pulse, blood pressure and respirations, but not in her state of consciousness. She was started off on penicillin. Her improvement was temporary, because she went into peripheral circulatory failure which did not respond, and she died.

DR. A. KERR GRANT: Dr. de Crespigny, Professor Robertson, this is rather like being an Aunt Sally. Now let us look at the history of this unfortunate woman of 67. There are certain things we can take as definite. The first is that she had rheumatic valve disease of a long-standing nature, complicated by auricular fibrillation. One cannot be sure of the duration of the auricular fibrillation; but we can say, because of the elevated jugular venous pulse, that she had a degree of congestive heart failure. She also had diabetes mellitus, and there is no doubt about this. It is difficult to know the duration of the diabetes, but presumably she must have had it for some time. Looking at the initial blood-sugar level, I would think that her diabetes had been aggravated by some condition which either caused her demise or just possibly was not particularly related to the exact cause of her death; and the reasons for this again are relatively simple. She had glycosuria, she had ketonuria, and she had a blood sugar of 640 mg. per 100 ml. and that is high enough for anybody. This to me means diabetes. She was ketonuric, and she was in a state of semi-coma. If we look now at her serum electrolyte level, we see that she has a serum chloride level well below normal, but the carbon-dioxide combining power is only slightly reduced. Nevertheless, these are the electrolyte changes that take place in a metabolic acidosis. One must remember again that there is not a gross lowering of her carbon-dioxide combining power. She has therefore signs of diabetes without a severe metabolic acidosis. Admittedly, it is more on the drop of chloride that one says this than the slightly lowered levels of carbon dioxide. She has also a state of dehydration to my mind. I wonder whether that elevated white blood count is of any significance or just the result of dehydration. It would be interesting to know whether this lady had firm black iron-stained faeces or whether it was a true melæna. One does not need really to go to elaborate laboratory investigations to decide that a woman of 67 with a blood sugar of 640 mg. per 100 ml., with urinary sugar "++++" and moderate acetone, is in a state of uncontrolled diabetes, whether the experts want to call that diabetic ketosis or uncontrolled diabetes with dehydration. To me this lady was suffering from pretty bad diabetes. We have two points at this stage to my mind. She had rheumatic valve disease with auricular fibrillation, and she had uncontrolled diabetes. We can then ask at this stage what has produced this state of uncontrolled diabetes? To answer this question we must go once more back to the history. She experienced severe epigastric pain for five days. It radiated through to

the back and loins. Was this a pancreatitis, or was it merely the acute abdomen associated with a state of diabetic acidosis? The absence of abdominal rigidity, the radiation of the pain to the back and loins and the vomiting would suggest pancreatitis, but the serum amylase level was normal. It was only one level, and it should have been three or four taken at hourly intervals. All in all, I would shy away from the diagnosis of pancreatitis and look for some other cause. Note the broncho-vesicular breathing. I have got to take a fairly definite line at this stage, and I would say that, possibly on the evidence presented, this woman could have had a degree of pneumonia at the right lung base. Could she have had a pneumonia, do you think, initiating a state of uncontrolled diabetes, and causing a diabetic acute abdomen? Diabetes and hyperglycemia do occur in acute pancreatitis, but the degree is usually relatively mild. Certainly, I do not believe that a pancreatitis *per se* could be the cause of such bad diabetes, but it could have had a summation effect, and we must remember that. She could have had a pancreatitis initially, or she could have had pneumonia. Now let us turn again and reconstruct the history. She had severe epigastric pain and vomiting, which could either be pancreatitis or an acute abdomen of diabetic coma or something else. What something else? A perforated gastric or duodenal ulcer? No; because though she complained of sudden severe abdominal pain, the house physician, when he examined her, found no tenderness or guarding. So you can give away the idea of any ruptured peptic ulcer. Intestinal obstruction? No; although one notices one point when one goes back through the history, that the bowels were usually regular, but that she had not opened them for five days. The important point when she was admitted to hospital was the lack of abdominal rigidity, but even this was certainly hard to assess, because she was semi-conscious. Now could a dissecting aneurysm or rupturing aneurysm of the abdominal aorta produce this sort of picture? I have not seen this very often first-hand—one always sees them nicely demonstrated at an autopsy—but it does not quite create the picture to me. One wonders at the significance of the firm black iron-stained faeces on the glove, the poor appetite, the past history of rheumatic fever and the nocturnal dyspnoea. Did she have pancreatitis initially, and if so, did it get suddenly worse? This to me is not the history of pancreatitis. The history tends to suggest surely a vascular accident. The possibility of a dissecting aneurysm or a ruptured abdominal aneurysm I have dismissed. The whole picture starts to point towards one illness, and we have a woman with an irregular pulse who suddenly gets acute abdominal pain. For my money she has had an embolus. I would think that she had had an arterial occlusion, and we can then explain the findings on examination. It is not at all uncommon at the beginning of a sudden arterial occlusion to find an abdomen which is free from tenderness and rigidity. Perhaps now I may even be allowed to explain the firm black iron-stained faeces on the glove as possibly not being iron-stained, but blood-stained. I would think that she had an embolus of the mesenteric artery, and the further history tends to confirm it. She developed generalized abdominal tenderness and absent bowel sounds, and it looks to me as though she has got a dilated small bowel in those X-ray pictures. She died of gangrene of most of her small intestinal tract. She was shocked, and this also fits. Is there anything now in this protocol that disturbs me in coming to this opinion? The one thing is the rapid and severe fall of her blood-sugar level. It was 640 mg. per 100 ml. She had what one might claim was an inadequate dose of insulin, and yet it fell to 43 mg. per 100 ml. I would think that probably the accent necessary on the control of the diabetes was on the dehydration, and not so much on the ketosis. Perhaps she should have had less insulin, but I can assure you that I would have given her at least this amount of insulin with a blood sugar of that level.

May I summarize, Sir, by suggesting the possible course of events? A lady with moderate unrecognized diabetes gets a mild pneumonia. Because of this, she proceeds to pass into a state of diabetic lack of control with ketosis and dehydration. The resultant change in her physical state causes further dehydration, and possibly at this stage the onset of auricular fibrillation in a heart with a diseased mitral valve. Because of the lowered circulating blood volume, the uncontrolled state of auricular fibrillation—one or other—she shoots an embolus into her mesenteric artery, and develops gangrene of her intestinal tract, and this unhappy event terminates her life three years before her allotted span, despite energetic methods of treatment. One could make out a very pretty story for this lady having developed a thrombosis in her celiac artery, which was not complete but affecting mainly the splenic branch, and

producing a degree of ischaemia of the pancreas with an aggravation of an already existing diabetic state, and that, as her condition deteriorated because of her diabetic state, she developed an acute and complete occlusion of her mesenteric vessel resulting in ischaemia of most of her small intestinal tract.

PROFESSOR ROBERTSON: Thank you very much, Dr. Kerr Grant, for that able summary. Now we want further discussion from the audience, in amplification, refutation or confirmation, whatever you please. I think in the best military fashion I ought to call for volunteers from the audience, and I see a surgeon over there—Mr. Wilson—who is interested in acute abdomens. Would you like to say a few words, as they say in university circles?

DR. C. G. WILSON: I would like to congratulate Dr. Kerr Grant. I thought his summary was excellent and feel that he has picked a very good runner, and probably the winner. The blood sugar level of 640 mg. per 100 ml. I would have thought was too high to occur in a case of pancreatitis without coexisting diabetes. I think his suggestion of mesenteric infarction is certainly not ruled out by the lack of a rigid abdomen. For some considerable time these patients often have quite a lax abdominal wall, and I would agree with the final finding. I think she died of a mesenteric infarction following on an illness of five days' duration, probably pancreatitis.

DR. H. R. GILMORE: Mr. Chairman, I am not at all happy with Dr. Kerr Grant and may become a little bit provocative. Firstly, Dr. Kerr Grant's suggestion about the diabetic ketosis. I am not quite clear how important he thought this was, but at the beginning of his discussion it seemed to figure rather largely, and one's reaction to this was, as he himself commented, that the bicarbonate reserve is really not much depleted. The low chloride could be explained by the vomiting which had occurred, and then in addition, one sees this remarkably quick response to a very moderate dose of insulin. Searching around to try to explain all this, I am going to make a suggestion that probably this patient suffered really from one condition, which was in fact the cardiac one. The patient was in heart failure, and therefore in a state in which a sequence of events could have quickly followed; but probably at the beginning of this story there was the embolic incident that Dr. Kerr Grant has described. I would suggest an embolism of the celiac axis that created a degree of pancreatic insufficiency, and that there was also an infarction of part of the small bowel. Perhaps I ought to include the mesenteric artery as well. Eventually the small bowel became gangrenous and ruptured just preceding the patient's death. I think the lack of abdominal rigidity does not, in the unconscious patient, preclude the situation, unfortunately. One has been struck by the great difficulty in assessing acute abdominal emergencies when a patient is shocked, as I take it this patient probably was. I agree that the serum amylase is disturbing if this is the sequence of events, but one has been misled by this observation both in a positive and negative sense. I just want to support Dr. Kerr Grant's idea, but I would like to put the embolus back as the major incident which occurred about the time of the abdominal pain.

Professor Robertson: Where was the embolus, Dr. Gilmore?

Dr. Gilmore: I should rather like to have an embolus in both the celiac axis and the mesenteric artery.

Professor Robertson: But they have different origins, you know. Now if nobody wants to discuss the case further, I think I might show the organs now, and then we might have a short period for one or two questions before I ask Dr. R. West to sum up.

This autopsy was done some time ago. There was infarction and dilatation of the small bowel, with about one pint of blood-stained watery fluid in the peritoneal cavity and an obvious mesenteric infarction. You can see the congestion and dilatation in the transverse colon, and across the splenic flexure, which is out of the picture. This is the small bowel pulled aside to show the very great oedema and the haemorrhagic congestion of the mesentery, and this one shows in another place little patches of fat necrosis at the root of the mesentery, and there is the blood-stained fluid in the peritoneal cavity. Here is the thrombosis quite a way down in the superior mesenteric artery, and according to Dr. Pak Poy, who did this autopsy, in the ileo-colic artery as well. This is a close-up of that vessel, not terribly sclerosed, but showing the thrombosis in these two main branches of the infarcted gut. The pancreas is congested, particularly about the head. There is moderate fat necrosis, but this is confined to the surface of the organ. The section shows fat necrosis, congestion of vessels and a little oedema



throughout the substance of the organ, but this is by no means an acute hemorrhagic pancreatitis. It is a mild pancreatitis, but still acute. Here are the islets: they are very numerous, very large and look very nice indeed, but from histological methods at autopsy that does not mean very much. Now we wondered why this pancreas should be congested. The inferior pancreaticoduodenal artery comes off the superior mesenteric artery. Unfortunately this artery was not specifically searched by the prosector, but we have been unable to demonstrate conclusively embolic material in the inferior pancreaticoduodenal artery. We would have liked the occluding thrombosis, of course, to have been in the origin of the superior mesenteric artery, but then we could have explained everything in one hit. Of course, emboli do move on, though it is very difficult to prove that they have. The heart, moderate mitral stenosis which admitted one finger, smallish vegetations on the valve, fibrosis and thickening of the chordae tendineae. There was no thrombosis in the auricular appendage. There were many evidences of infarction in other organs, some of them quite old. There was an old infarct in each kidney and in the spleen. There was a softening in the occipital cortex of the brain, obviously of some age.

So Dr. Kerr Grant is substantially right, and what we still are not too clear about is why this patient had these odd blood-sugar changes and why the blood sugar fell so quickly after she was given what I myself think, though I am no physician, was an almost homeopathic dose of soluble insulin.

Any more questions or comments about this case?

Dr. SANGSTER: Did he examine the lungs at all?

Professor Robertson: I should have mentioned that the right lower lobe did show hypostatic pneumonia. Any further points?

Dr. BROWN: The absence of evidence of thrombosis in the left auricular appendage just reemphasizes a point which is borne out in any series of mitral valve lesions associated with emboli. Almost half of those cases do not show any evidence of thrombus in the auricle. Some people might argue that that is a reason for not doing mitral valvotomy, but of course, that is wrong.

Professor Robertson: I am very interested to hear you say that, Mr. Brown, because I looked up half a dozen cases of this condition which we have had in the last two and a half years. I think we probably have had more cases than that, but these are the ones we happen to have photographed, and not one of those half dozen had any residual thrombosis in the auricle at all. In one of them, indeed, the infarction of the mesentery had come from a large mass of atherosclerotic thrombus in the arch of the aorta, but the other five who had all been fibrillating had no thrombosis in the auricle at all, which makes it hard, of course, to prove that that is where the emboli came from. Any more points about it? The X-ray; we had our usual frantic hunt for the X-ray of this case. We always find that the X-rays of interesting cases are never available. Somebody has a jolly good collection of X-rays. We finally found the abdominal X-ray of this case in the X-ray Department's library, where it had been put by Dr. Martin Begley as a classic example of the X-ray of a mesenteric thrombosis.

Dr. WEST: I must congratulate Dr. Kerr Grant. His sort of "diagnostix" come from acumen and luck. At one stage he almost confused me until the last 35 seconds, when he came down to detail and really got on to the diagnosis of the condition. Like myself and everyone here, he has been a bit confused by the sugar in the urine, and these queer electrolytes. I think, having looked at this post-mortem, we are all happy about the mesenteric thrombosis. She came in shocked, she was partly resuscitated and it increased her circulating blood volume, and she looked a little better for a few hours, and then she just died. Just prior to death she had recovered from shock, and had the classical signs of pain in the right iliac fossa and absent bowel sounds. I think the difficulty about this woman is her preceding history. She was well until five days ago, then she got epigastric pain. Now I think that that was pancreatitis. She shows evidence of other embolic phenomena; she has had multiple emboli through the years. Did this woman have a small embolus into her pancreaticoduodenal artery giving her subacute pancreatitis? Did she have subacute pancreatitis for some other reason? I do not think it was the result of this recent embolus. If she had had a pancreatitis as a result of complete embolization of her pancreaticoduodenal artery, she would have had acute hemorrhagic pancreatitis. Now diabetes, the result of pancreatitis, is queer, and this is a queer diabetes, because you can get very high sugar levels with moderate ketosis

that responds rapidly and readily to insulin. In fact, a readily controlled diabetic coma or ketosis is suggestive that the cause is pancreatitis. We have had two cases in my clinic, unfortunately both died unrecognized, but they had a readily controlled ketosis and they both had pancreatitis. Is this woman ketotic? Well, I suppose one must say that she is; but one would classify her as an uncontrolled diabetes with dehydration. Was she a diabetic before all these things happened? We do not know. What other evidence have we got that she had pancreatitis? There is one episode in her history which is very important, and that is upper abdominal pain radiating to the loins, and vomiting. Biochemical investigation of pancreatitis is completely unrewarding. If you get a positive answer, it is all right. If you get a negative answer, well, it is still pancreatitis, as we see here. I could not quite follow Dr. Gilmore's difficulty, but I know he was trying to tie up her diabetic state with her immediate embolic state and death; but I do not think you can do it in this case. I think you have got to separate this history into two phases, one of five days ago and then this acute mesenteric embolus. It is a very sad thing to see on a protocol that a diabetic ketotic was given only 20 units of insulin intramuscularly. That was very smartly followed up, of course, by someone giving her 100 or 120 units, and the blood sugar fell. Now the effect of that 120 units, to my mind, means that this woman is not a chronic diabetic with severe ketosis, but that she has got a queer type of diabetes, probably the result of pancreatitis, because she responds so rapidly to such a small dose of insulin. I think it is a very nice, tidy case, and I think that Dr. Kerr Grant did very well.

#### Diagnosis.

Pancreatitis; diabetic ketosis; mesenteric embolism; cardiac failure.

## Out of the Past.

### A "PROFESSOR OF HERBS"<sup>1</sup>

[From the *Australasian Medical Gazette*, June 20, 1904.]

ACCORDING to a report in the *Mudgee Guardian* of June 2nd, an inquest was held on the body of a man named James Hickey, who died in the Mudgee Hospital on May 31st. It appears that the man was being treated by a "Professor of Herbs", named Bull, for rheumatism and partial paralysis of the spine, the treatment consisting in rubbing in turpentine and mercury. One liniment which had been used on deceased had been made up for the treatment of a horse! Dr. Hawthorne was called in, and finding the patient suffering from acute nephritis, ordered his removal to the hospital, where he died two or three days later. Dr. Willis, the medical officer at the hospital, made a post-mortem examination, and found acute nephritis and congestion at the bases of both lungs. The organs showed no signs of mercurial poisoning. The "Professor", under examination, showed gross ignorance of the merest rudiment of knowledge of herbs. He admitted having hired a man and his horses, and that he used to ride up and down the town while his groom used to go and see the patients. The jury returned the following verdict: "That deceased died from inflammation of the kidneys, and that the symptoms of this disease must have been present when he was seen by William Bull . . . and that the treatment then prescribed by Bull was improper, but there was no evidence to show it accelerated death."

## Medical Practice.

### BLOOD TRANSFUSION.

THE following notes on blood transfusion are taken from Newsletter No. 14 of the N.S.W. Branch of the British Medical Association. They are republished here by permission of the Branch Council.

<sup>1</sup> From the original in the Mitchell Library, Sydney.

### Hospital Transfusion Officers.

Blood transfusions should be administered in hospitals so that the patients may be observed continuously by trained nursing staff. As the majority of transfusions are given in public hospitals, and as transfusions may be required at short notice, it is important that every public hospital should have an efficient organization. The responsibility for this organization rests primarily with the medical profession and not with the nursing or administrative staff. A hospital transfusion officer should be appointed by the board of every hospital on the recommendation of the medical staff. It is more important to select a person who will be interested in the problems than to decide that the work should be the responsibility of a particular department. The transfusion officer should be a senior full-time member of the staff or, where there are no such appointments, a visiting pathologist or one of the honorary medical staff.

The duties of the hospital transfusion officer are as follows:

1. To introduce and supervise a system which will include a compatibility label for bottles and a record sheet.
2. To arrange that at all times there is somebody available who is competent to determine the blood groups of patients and cross-match blood before transfusion.
3. To ensure a supply of efficiently cleansed and sterilized giving sets, which should be kept in a convenient part of the hospital.
4. To supervise the contents of the blood refrigerator and check its temperature at regular intervals.
5. To ensure that blood is kept only in the central refrigerator and not dispersed unnecessarily to other parts of the hospital.
6. To instruct resident medical officers, nurses and others in the principles and practice of blood transfusion.
7. To arrange for a room which can be used for the bleeding of donors and for the storage of sterile apparatus, of albumin, and of other fluids for intravenous injection.
8. In country areas, to arrange for a panel of blood donors, to add to it as required, and to supervise its management.

This may seem to be a formidable list of duties for the transfusion officer, but, once established, the organization should run smoothly.

### Blood Transfusion Equipment.

Many different types of transfusion apparatus are used in hospitals throughout Australia. This is largely because some hospitals have failed to replace outmoded apparatus with standard equipment. Often a blood transfusion in a small centre entails improvisation of both donor and recipient sets; consequently the collection and the giving of blood may be hazardous.

All recipient sets (for giving blood and fluids) should be of the plastic disposable type, one variety of which is now manufactured in Australia. Plastic apparatus for the collection and storage of blood may become available in Australia in the near future. It should then be used in all country hospitals. The present imported bags are difficult to use by inexperienced people, and it is recommended that

for the time being apparatus for collecting blood should be the standard apparatus of the Red Cross Blood Transfusion Service. It is suggested further that bottles and taking sets should be purchased sterile and should be used only once. They should not be cleansed and sterilized in the hospital.

It should be the responsibility of the hospital transfusion officer to inspect all apparatus at regular intervals to ensure that there are adequate supplies available, particularly for emergency use.

### Cross-Matching.

Except in extreme emergencies a cross-matching test should be performed before every transfusion. This test is important to eliminate errors of identification (the commonest cause of incompatible transfusions) and to detect immune antibodies which may have developed in the patient's serum after pregnancy or previous blood transfusion. The increasing number of blood transfusions that are being given has resulted in an increase in the frequency with which patients are immunized against blood group antigens. The resulting immune antibodies can all cause destruction of red cells transfused into patients, and may result in death.

Recent advances in serology have shown that many immune antibodies are not detected by the simpler tests, such as the saline, albumin or P.V.P. test. Admittedly, antibodies which fail to react in these tests (such as those against the Duffy, Kell or Kidd antigens) are rarely found, but they can and have caused death and therefore cannot be overlooked. Many workers have tried to develop a simplified test which will detect incomplete antibodies against all blood group antigens and can be performed with minimum time and apparatus. So far no such simple test has been devised. The indirect Coombs test is the only one which, when carefully performed, almost excludes the possibility of hemolytic transfusion reactions due to blood group antibodies.

Unfortunately an aura of mystery is often associated with the indirect Coombs test. It is not a difficult test, although it requires practice and experience with the rigid use of controls. It can be mastered by any medical graduate, but by practice and not by reading instructions in a book. Wall charts illustrating all the steps are available from the Red Cross Blood Transfusion Service in N.S.W., and instruction can be given by arrangement with the Director of that Service.

### Reactions to Intravenous Fluids.

Table I summarizes the principal features of blood transfusion reactions.

Some points require emphasis:

1. The commonest cause of death following blood transfusion is circulatory overloading. This risk can be minimized by transfusing all anemic patients slowly (never more than 1 litre in 6 hours) and by using concentrated red cells instead of whole blood for the treatment of anaemia.
2. Hemolytic reactions are usually due to errors in identifying patients or bottles of blood. A cross-matching

TABLE I.  
Reactions to Transfusions.<sup>1</sup>

Type.	Symptoms and Signs.	Treatment.	Prevention.
Pyrogenic .. ..	Pyrexia, rigors, anxiety, restlessness.	Slow rate of flow. Give ephedrine, morphine and antihistamines. If no improvement in 30 minutes, discontinue transfusion.	Care in cleansing of giving sets, bottles, etc.
Circulatory .. ..	Distension of cervical veins, pulmonary edema, dyspnoea, headache, heaviness in limbs. May be pyrexia and rigors.	Discontinue transfusion. Give digoxin and morphine. If necessary, use limb tourniquets and remove blood.	Give all fluids very slowly to patients with normal blood volume. Use concentrated red cells.
Allergic .. ..	Usually pyrexia and rigors, urticaria, facial edema, dyspnoea. Sometimes cyanosis and peripheral collapse.	Discontinue transfusion. Give morphine, adrenaline and antihistamines. Watch for laryngeal edema.	Careful blood grouping and cross-matching. Careful technique in storing blood.
Hemolytic .. ..	Pyrexia, rigors, pain in lumbar region, sometimes pain in vein, jaundice, hemoglobinuria, hemoglobinemia, oliguria, later uremia.	Save urine specimens. Collect blood samples. Discontinue transfusion. Do NOT give saline. Obtain expert advice.	Careful technique in collecting blood. Storage of blood at low temperature.
Infected blood ..	Hyperpyrexia, pain in limbs and chest, profound collapse and shock, pallor, dyspnoea, headache, low blood pressure, rapid pulse.	Save all blood specimens. Anti-shock treatment with blood, serum and nor-adrenaline. Antibiotics in large amounts.	

<sup>1</sup> Extract from "A Guide to Blood Transfusion" (Second Edition), R. J. Walsh and H. K. Ward.

certificate should always be completed by a qualified person and the compatible bottles intended for a particular patient identified with labels or tags. To ensure that the cross-matched blood is given to the right patient (who may be unconscious, semiconscious or asleep) it is recommended that a plastic label with the patient's name should be tied to the wrist of every patient admitted to hospital. Such an identification would also be useful to anaesthetists, surgeons and nursing staff. The cross-matching certificate and the labels should be carefully checked before a bottle is given.

3. Blood should not be administered if it has been out of the refrigerator for more than one hour. Bacterial multiplication may occur rapidly at room temperature and result in a severe or even fatal reaction.

4. Every patient receiving blood or other fluid by the intravenous route should be closely observed. The temperature, pulse rate and respiration rate should be recorded at hourly intervals and any abnormality reported. Nurses should be instructed to pay attention to the cervical veins because distension of these vessels is a danger sign, indicating overloading of the circulation. Pain along the vein should also be regarded seriously. All specimens of urine passed during and immediately after a transfusion should be saved for examination if required. Used blood bottles should remain unwashed in a refrigerator for at least 24 hours.

If fuller information is required, it is to be found in the textbook "A Guide to Blood Transfusion" (Second Edition), by R. J. Walsh and H. K. Ward.

## Correspondence.

### EMERGENCY CARDIO-RESPIRATORY RESUSCITATION OUTSIDE THE HOSPITAL.

SIR: So much publicity has been given to the mouth-to-mouth method of resuscitation after immersion, that I feel the medical profession are not being consulted as much as they should be in these very serious accidents. Unless the patient is able to hold his breath or glottic spasm occurs, large amounts of fresh or salt water are inhaled, and devastating changes in the blood volume and electrolytes cause death in most cases in a few minutes.

D. G. Rushton,<sup>1</sup> in an examination of 64 fatal cases, found only two in which death was delayed for a few hours, and in these a gross hemorrhagic inflammatory oedema of the lungs was present.

It would seem obvious, therefore, that water should first be drained from the air passages before resuscitation is commenced. Every doctor will have noticed how easily a patient becomes blue under an anaesthetic from a little mucus; yet we are being told water in the trachea and bronchi is immaterial.

Yours, etc.,

F. W. SIMPSON.

City Beach,  
Western Australia.  
December 5, 1961.

### ANTIBIOTIC DRUGS, THE BLOOD SUGAR LEVEL AND GLYCOSURIA.

SIR: I would greatly appreciate publication of an observation which I feel is of importance in the administration of antibiotic drugs. This is the production, in patients receiving chloramphenicol therapy, of (i) erroneously high results in blood-sugar readings using copper or picric acid reagents, and (ii) erroneous positive results when urine is tested with Benedict's solution.

This was first observed in a child, aged two and a half years, who was receiving chloramphenicol therapy, whose urine, when tested with Benedict's solution, showed a glycosuria on a number of occasions. Fasting blood sugars, whilst the child was still on chloramphenicol palmitate, showed erroneous fasting blood sugar of 240 mg. per 100 ml. and, after ingestion of a meal, an erroneous blood sugar

of 370 mg. per 100 ml. Chloramphenicol palmitate was discontinued, and a glucose tolerance test was carried out a week later and found to show a normal curve. Chloramphenicol palmitate was then recommenced and a further blood sugar performed which showed results ranging from 240 to 370 mg. per 100 ml.

Six other patients who were receiving chloramphenicol in the recognized dosages at the same time showed abnormal blood sugars, ranging from 200 to 290 mg. per 100 ml. Blood sugars performed on each of these six patients after cessation of chloramphenicol showed results well within the normal curve. It is of interest to note that the urine of these six patients showed a glycosuria when standard tests with Benedict's solution were performed, although when either test tape or "Clinistix" were used the results were negative. Blank tests using a solution of 50 µg. of chloramphenicol reduced copper and picric acid solutions, giving a result equivalent to 130 mg. per 100 ml. of dextrose.

It would appear from the above that the urine from patients receiving chloramphenicol should not be tested routinely with Benedict's solution for sugar, and also that, if blood sugars are required on such patients a method using reagents other than copper solutions and picric acid solutions should be employed.

I am deeply indebted to Mr. R. Webster, pathology technician at Bathurst District Hospital, for his help and cooperative interest in the above cases.

I have been unable to find any reference to this effect of chloramphenicol in current literature and would appreciate comment.

Yours, etc.,

E. R. GREENACRE.

191-193 George Street,  
Bathurst,  
New South Wales.  
November 27, 1961.

### ASPIRIN AND CHRONIC GASTRIC ULCER.

SIR: The article by Douglas and Johnston of December 2 opens with the suggestion that the association of gastrointestinal bleeding with salicylate therapy is a relatively recent observation.

Salicylic acid was synthesized by Kolbe in 1874, and its use as an antipyretic and in the therapy of acute rheumatism was established by 1876. Pullmann in 1889 reported that in some individuals it gives rise to hemorrhage from the mucous membranes, and even he may not have been the first, for I have not been able to check a report by Schuchardt of 1886. The association appears to have been so well established that it appears as an unadorned statement in Binz's "Lectures on Pharmacology", second edition of 1895.

Yours, etc.,

K. D. MURRAY.

22 Mahar Street,  
Kensington Gardens,  
South Australia.  
December 5, 1961.

### CHIROPRACTORS AND DIETITIANS IN WESTERN AUSTRALIA.

SIR: I would like to draw the attention of readers to a report published recently in the Melbourne *Herald*, which stated that a Royal Commission on natural therapy in Western Australia has recommended that the activities of chiropractors and dietitians should be encouraged. It went on to say that "encouragement should be given to chiropractors and dietitians because it was unlikely that in the immediate future medical practitioners would embrace these fields".

I was very surprised to see the Commission's report, and most disturbed at the second paragraph. For years, manipulation procedures have been used, not only by orthopaedic surgeons and physical medicine specialists, but also by many general practitioners who have studied these measures. To say that medical practitioners are not interested in dietetics is again entirely false, and one can only feel that the evidence placed before this Royal Commission was very one-sided. One might instance the three excellent volumes on manipulation written by Dr. James B. Mennell of St. Thomas' Hospital, ably illustrated by

<sup>1</sup> Second International Meeting on Forensic Pathology and Medicine, 1960.



X-ray photographs; even before that, the excellent treatise by Timbrell Fisher, late Hunterian Professor (1921-1922) of the Royal College of Surgeons of England—"Treatment by Manipulation" (1928); and there are many others. At the present time I could name several men in Australia who are specializing in manipulative procedures, and incidentally, there is a very well qualified one in Auckland, New Zealand. The facts alone must make the findings of the Royal Commission in Western Australia an anachronism. In the fields of dietetics also it is quite untrue that medical men are disinterested. One might, of course, go back as far as the days of Sir Robert McCarrison, of the Indian Medical Service, who, prior to 1928, made a seventeen-year study of deficiency diseases in India. Coming to modern times, one knows of many practitioners whose patients are instructed in the matter of dietetics. I have not included the large number of well-trained physiotherapists who are also capable of giving manipulation under medical supervision, or the dietitians' association, who can give competent advice.

It is perhaps unfortunate that manipulative procedures and physical diagnosis are not included in the curriculum of the medical course as a separate subject. Were this done, it is more likely that the profession in general would be more likely to refer their problem cases that may require diagnosis and treatment by manipulation to the physical medicine specialist. So often one sees cases who have been thoroughly investigated by specialists, and who have been informed that there is nothing seriously wrong, but are not given any further advice as to what they should do or whom they should go to in the medical profession to obtain relief. Again one sees the case of one who has been told he has a crumbling disc, and the matter is left at that with no further advice. In desperation, and feeling that the medical profession can do no more for him, he frequently goes to "unqualified" people to try and obtain relief. I refer particularly to cases with pain in the spine and root pain in the arms or legs; 95% of these cases are due to osteoarthritis or inflammatory causes, which can be relieved by the physical medicine specialist or a physiotherapist acting under his directions.

Finally, this report states that:

In broad principles, the commission recommended that legislation should be introduced to include the following:

The definition of a chiropractor should enable him to use heat processes as preparation for manipulation and also to use X-rays for diagnostic purposes.

It is very questionable whether chiropractors are sufficiently trained in radiology; their training in no way comes up to the high standard set by The College of Radiologists of Australasia.

Yours, etc.

W. GORDON RICH,

119 Macquarie Street,  
Hobart, Tas.  
December 7, 1961.

President,  
Australian Physical  
Medicine Association.

#### THE TOMBSTONE OF WILLIAM RUSS PUGH.

SIR: In 1947, the centenary of the giving of the first ether anaesthetic in Australia by William Russ Pugh was celebrated in Launceston. At that time and for some time afterwards efforts were made to discover the date and whereabouts of Pugh's death. Whether these efforts were successful I do not know.

In 1958, Mr. and Mrs. T. E. Burns, of Launceston, Tasmania, were travelling in England. Whilst at Brighton, Mrs. Burns, who had been educated in Brighton, went to search for the grave of her former school teacher, Miss Sarah Fuggle. She found the grave in the extramural part of the cemetery. Almost next to it she observed Dr. Pugh's tombstone, and copied down the inscriptions. On one face is:

Sacred to the most dear memory of William Russ Pugh, M.D., formerly of Launceston, Tasmania, and afterwards of Melbourne, Australia who died in London December 27th 1897. In his 92nd year. Blessed are the pure in heart for they shall see God.

On another face is:

Cornelia Anne, wife, died Brighton January 6th 1874—Aged 77.

On another face is:

Cornelia an infant daughter died in Tasmania January 2nd 1839—aged 7 months 20 days.

From the wording it would appear that the inscriptions were all placed on the stone after Pugh's death. It would

seem that Pugh must have gone back to England at some time before 1874.

Mrs. Burns took a photo of the tombstone. It is a transparency, and it is not yet known if a print sufficiently clear for publication can be prepared from it. It might be a good idea if a Society of Anaesthetists in England were asked to care for the grave. Mrs. Burns obtained the location of Miss Fuggle's grave from the office.

Yours, etc.

5 Frederick Street,  
Launceston,  
Tasmania.  
December 11, 1961.

C. CRAIG.

## Naval, Military and Air Force.

### APPOINTMENTS.

THE following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 84, of October, 1961.

#### AUSTRALIAN MILITARY FORCES.

##### Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional appointment of 162593 Captain D. A. O'Rourke is terminated, 27th September, 1961.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—2127883 Major J. T. Dunn is appointed Commanding Officer, 1st Field Ambulance, and to be Temporary Lieutenant-Colonel, 1st July, 1961. 2152043 Major J. Laing is appointed Commanding Officer, 5th Field Ambulance, and to be Temporary Lieutenant-Colonel, 1st July, 1961. 279012 Lieutenant-Colonel G. Clifton-Smith, E.D., relinquishes command 5th Field Ambulance, 30th June, 1961. 270937 Lieutenant-Colonel A. L. Hellestrand and 2127128 Captain J. M. Ellis are appointed from the Reserve of Officers, 11th August, 1961, and 24th July, 1961, respectively.

###### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—431963 Colonel V. D. Plueckhahn (Assistant Director Medical Services, Head-quarters, 3rd Division) ceases to be seconded whilst in the United Kingdom and United States of America, 1st August, 1961.

###### Central Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional ranks of Captains 432129 M. S. Downey and F41261 M. A. Kinlough are confirmed. 432280 Lieutenant B. G. Mollison is appointed from the Reserve of Officers and to be Captain (provisionally), 30th August, 1961.

*Royal Australian Army Medical Corps (Medical).*—431907 Lieutenant-Colonel R. A. Burston is appointed Commanding Officer, 3rd Field Ambulance, 1st October, 1961.

#### Reserve Citizen Military Forces.

##### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—To be Honorary Captain, 28th September, 1961—Desmond Anthony O'Rourke.

*Royal Australian Army Medical Corps (Medical).*—Major P. B. Robin is transferred from the Reserve Citizen Military Forces, Royal Australian Corps of Signals (Northern Command), 20th September, 1961.

#### ROYAL AUSTRALIAN AIR FORCE.

##### Permanent Air Force.

###### Medical Branch.

The resignation of each of the following officers is accepted:—Squadron Leader G. C. Nelson (018487), 8th September, 1961; Flight Lieutenants A. M. Muirhead (042575), 1st September, 1961; P. B. Sims (0313287), 8th September, 1961.

##### Active Citizen Air Force.

###### Medical Branch.

No. 22 (City of Sydney) (Auxiliary) Squadron.—Flight Lieutenant D. C. Mackenzie (0211187) is transferred to the Reserve, 8th June, 1961.

No. 23 (*City of Brisbane*) (*Auxiliary*) Squadron.—Pilot Officer D. M. Coghlan (0116194) is transferred from the Reserve, 8th June, 1961.

#### Air Force Reserve. Medical Branch.

Each of the following former officers is appointed to a commission with the rank of Flight Lieutenant:—R. P. Quirk (0314324), 10th June, 1961; R. H. Mackay (036622), 12th July, 1961.

The following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 91, of November 16, 1961.

#### AUSTRALIAN MILITARY FORCES.

##### Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 139222 Captain W. J. Crawford is confirmed. The provisional appointment of 161910 Captain A. P. Morton is terminated, 29th September, 1961. *To be Captain (provisionally), 30th September, 1961—161909* Alexander Denis Campbell.

###### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 3111532 Captain H. A. Marks is confirmed. The provisional appointment of 3101960 Captain J. K. Dawborn is terminated, 24th August, 1961.

##### Reserve Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The following officers are placed upon the Retired List (Northern Command) and granted a military title equivalent to the substantive or honorary rank shown, with permission to wear the prescribed uniform, 31st August, 1961:—Major A. V. Henry and Captain R. B. Charlton.

*Royal Australian Army Medical Corps (Medical).*—Honorary Captain E. L. Walker is retired, 31st August, 1961.

*Royal Australian Army Medical Corps (Medical).*—*To be Honorary Captain, 30th September, 1961—Anthony Park* Morton.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—The following officer is placed upon the Retired List (Eastern Command) and granted a military title equivalent to the substantive or honorary rank shown, with permission to wear the prescribed uniform, 31st October, 1961:—Captain R. M. Rawle.

*Royal Australian Army Medical Corps (Medical).*—Honorary Captain R. Swinburn is retired, 31st October, 1961.

###### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Honorary Captain, 25th August, 1961—John Kingsley* Dawborn.

#### ROYAL AUSTRALIAN AIR FORCE.

##### Permanent Air Force.

###### Medical Branch.

Alexander Robert White (0310795) is appointed to a four year short service commission on probation for a period of twelve months, 31st July, 1961, with the rank of Flight Lieutenant.

Squadron Leader G. S. Radford (025626) is granted the acting rank of Wing Commander, 4th September, 1961.

##### Air Force Reserve.

###### Medical Branch.

The following former officer is appointed to a commission, 18th July, 1961, with the rank of Flight Lieutenant:—P. E. Connor (019761).

The following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 93, of November 23, 1961.

#### AUSTRALIAN MILITARY FORCES.

##### Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 161916 Captain D. H. McClymont is confirmed.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional appointment of 262453 Captain K. D. Coulthurst is terminated, 28th August, 1961.

###### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 3129011 Captain A. M. Marshall is confirmed.

##### Reserve Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The appointment of Honorary Captain M. R. Harrison is terminated, 19th October, 1961.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Honorary Captain, 29th August, 1961—Keith Dudley* Coulthurst.

The following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 96, of November 30, 1961.

#### AUSTRALIAN MILITARY FORCES.

##### Citizen Military Forces.

###### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Captain (provisionally), 25th October, 1961—162973* Robert Rowland Edkins Brown.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional ranks of Captains 2130126 D. S. Child and 2146625 F. C. Hinde are confirmed. The provisional appointment of 2158721 Captain L. A. Feain is terminated, 31st August, 1961.

###### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional appointment of 73015 Captain (Temporary Major) R. C. Webb is terminated, 8th October, 1961. *To be Captain (provisionally), 9th October, 1961—73015* Ronald Campbell Webb.

##### Central Command: General List.

*Royal Australian Army Medical Corps (Medical).*—*To be Major, 31st October, 1961—432054* Captain (Temporary Major) L. C. Hoff. The Army number of 439091 Captain (provisionally) B. G. Mollison is as now shown and not as described in Executive Minute Number 85 of 1961, promulgated in the *Commonwealth of Australia Gazette* Number 84 of 1961.

##### Reserve Citizen Military Forces.

###### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Honorary Captain, 1st September, 1961—Leo Arthur* Feain.

#### ROYAL AUSTRALIAN AIR FORCE.

##### Permanent Air Force.

###### Medical Branch.

Andrew Neville Corbett (017369) is appointed to a temporary commission, 2nd May, 1961, with the rank of Pilot Officer (student).

Flight Lieutenant E. B. Morgan (0310769) is granted the acting rank of Squadron Leader, 23rd October, 1961.

##### Air Force Reserve.

###### Medical Branch.

Kevin Walter Vanderleur (277705) is appointed to a commission, 18th September, 1961, with the rank of Flight Lieutenant.

Flying Officer K. L. Hayes (418409) is transferred from the General Duties Branch and is promoted to the rank of Flight Lieutenant, 6th October, 1961.

## The Royal Australasian College of Physicians.

### PFIZER TRAVELLING FELLOWSHIP IN CLINICAL MEDICINE, 1963.

A PFIZER Travelling Fellowship in Clinical Medicine (Australia) has been made available by the Pfizer Corporation Australia for award by The Royal Australasian College of Physicians for the year 1963. The purpose of the fellowship is to contribute to the advancement of Australian medicine at the post-graduate level, and to promote closer relationships between Australian physicians and the medical profession abroad. The fellowship will have a value of £1500 (Australian), and the duration of the fellowship will be from four to six months.

Consultant physicians in the approximate age group 35 to 45 years, who practise in Australia, and who are active teachers in hospitals, are eligible for this fellowship. The Fellow will be expected to visit the United Kingdom and the United States of America in order to exchange current medical thoughts and ideas in these countries, so that upon his return he may give his Australian colleagues the benefits of his experience.

Details of the conditions of award of this fellowship may be obtained on application to the Honorary Secretary of The Royal Australasian College of Physicians, 145 Macquarie Street, Sydney. The closing date for applications is February 15, 1962.

### MEMBERSHIP EXAMINATION.

INTENDING candidates for the next examination for membership of The Royal Australasian College of Physicians are reminded that applications should be lodged by Wednesday, January 17, 1962. The written examination will be held in capital cities on Friday, February 16, and the clinical examination will be held in Sydney commencing on or about Monday, March 26. Candidates should signify in which city they desire to take the written examination. Application forms are obtainable from the Honorary Secretary, 145 Macquarie Street, Sydney.

## Notes and News.

### The Orthoptic Council of New South Wales.

The Orthoptic Council of New South Wales announces that a course of instruction in orthoptics, of two years' duration, will commence on February 1, 1962. Applicants must be aged 18 years, or 17 years with their Leaving Certificate. They should apply to the Secretary, Dr. M. Sterling-Levis, 235 Macquarie Street, Sydney, by January 25, 1962, submitting copies of three original references.

### Salk Vaccine Supplies.

The Minister for Health, Dr. D. A. Cameron, has announced that the Commonwealth Serum Laboratories, Melbourne, have begun the distribution of 600,000 doses of Australian-made Salk vaccine. Final tests of the vaccine, which were highly satisfactory, were completed on December 8, 1961, and distribution was begun immediately. Special steps have been taken to meet the position existing in Queensland and New South Wales. Supplies of vaccine were forwarded to Brisbane (11,000 doses) and to Sydney (30,000 doses) during the same week, to be held in both cities while the final tests were completed in Melbourne. As soon as it was established beyond doubt that the batch of vaccine was successful, the State Departments of Health were notified by telephone. Consignments which had been packaged in Melbourne to await the final tests were flown to the other States at once. About 80,000 doses of vaccine were involved in the distribution. The distribution will

continue for a fortnight. Further Australian supplies are expected during January, 1962. Meanwhile the Commonwealth Serum Laboratories have available, as a reserve, the vaccine recently imported from Canada. This vaccine has also passed the requisite tests.

## Diary for the Month.

- JANUARY 9.—New South Wales Branch, A.M.A.: Council Quarterly.  
JANUARY 15.—Victorian Branch, A.M.A.: Finance Sub-Committee.  
JANUARY 16.—New South Wales Branch, A.M.A.: Executive and Finance Committee.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or Tavistock Square, London, W.C.1.

**New South Wales Branch** (Medical Secretary, 135 Macquarie Street, Sydney): Medical Officers to Sydney City Council. All contract practice appointments in New South Wales. Members are requested to consult the Medical Secretary before undertaking practice in dwellings owned by the Housing Commission.

**South Australian Branch** (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

## Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full data in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: 68-2651-2-3.)

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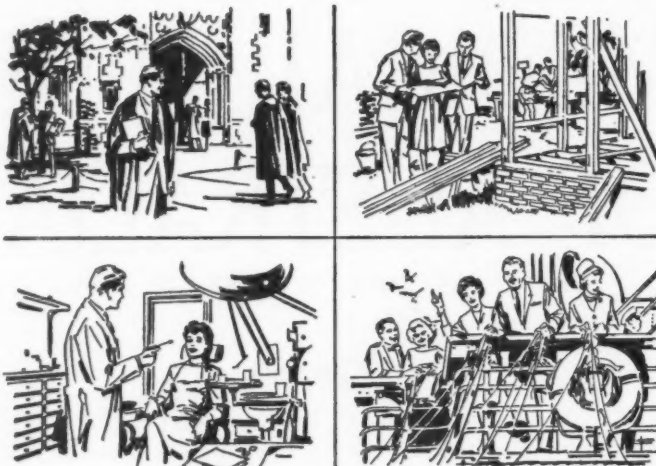
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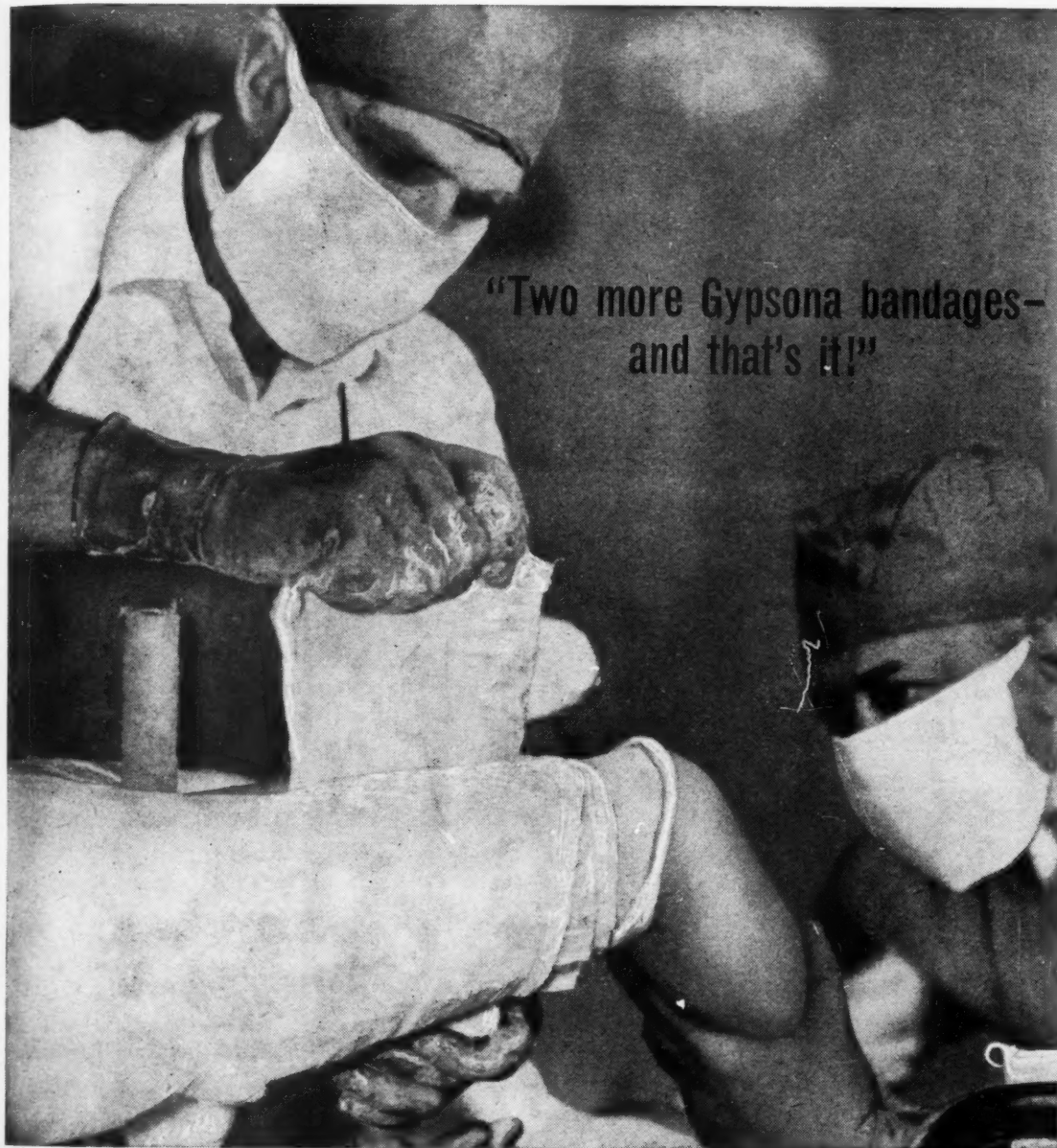
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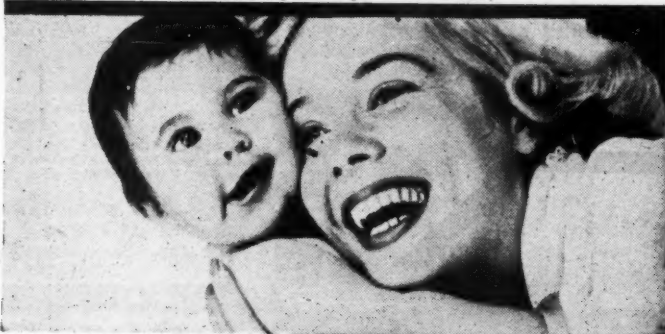


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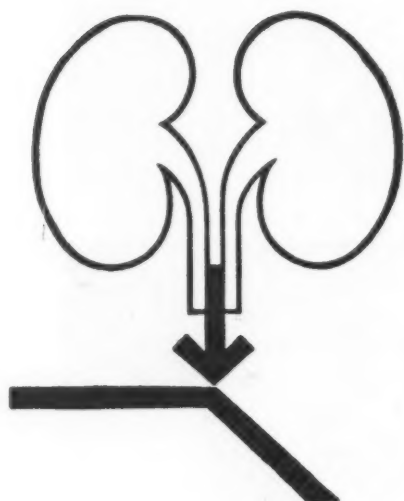
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\*Combination Tetracycline-Oleandomycin Treatment of Acute Respiratory Infection in Childhood; Arneil, G. C., *Antibiotics Annual*, 1958-1959.

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†Development of Resistance to Antibiotics by Staphylococci: A comparative study using tetracycline and oleandomycin separately and in combination; Thomson, et al., *M.J.A.*, 12th September, 1959.

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\*In-Vitro Activity of Sigamycin (Synermycin); Fairbrother, R. W. (1957), *Lancet*, 2:974.

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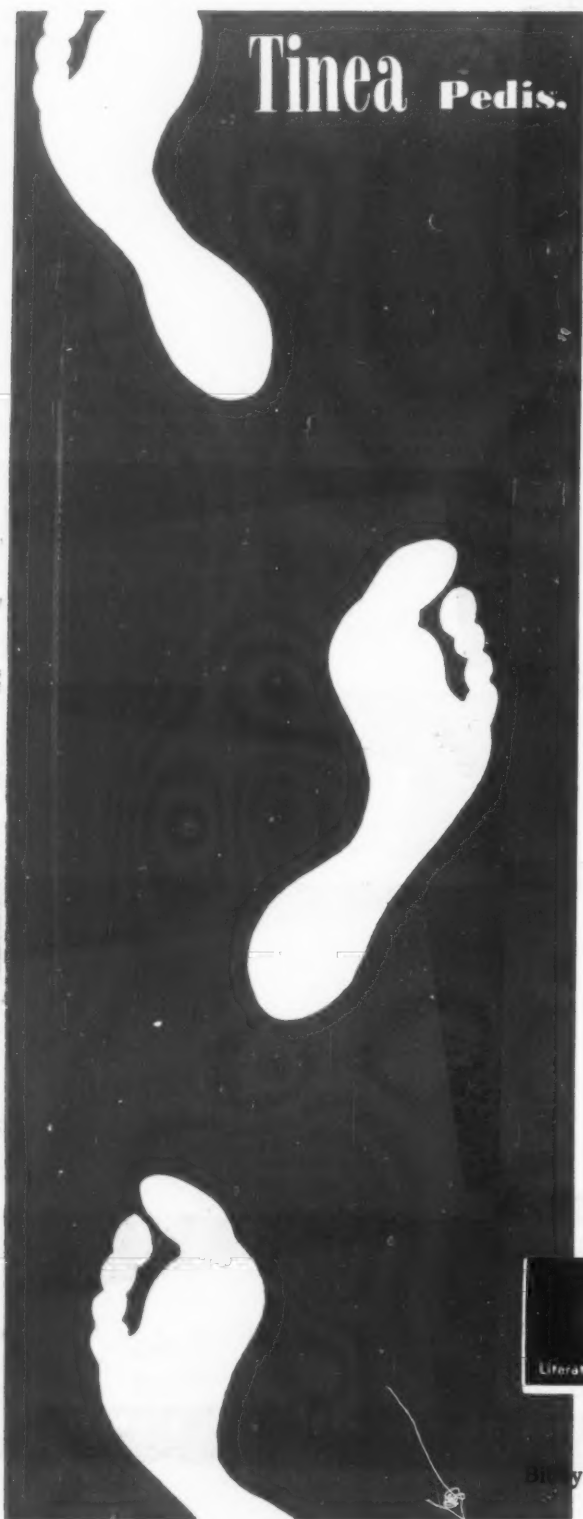
\*Oleandomycin: Cross-resistance Studies with Clinical Isolates of *Micrococcus pyogenes* var. *aureus*; English, A. R., *Antibiotics Annual*, 1957-1958.

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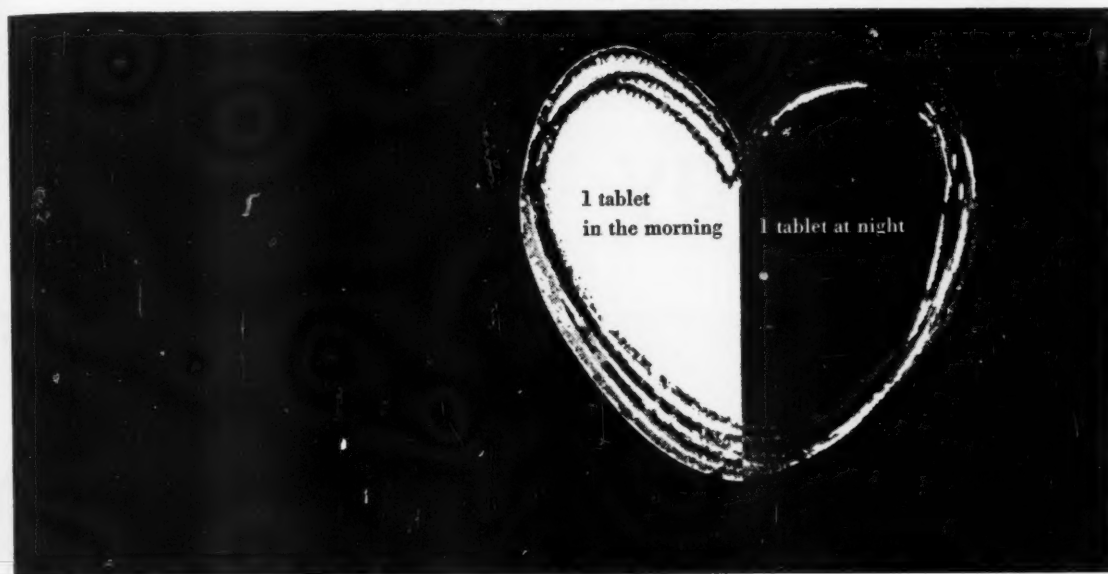
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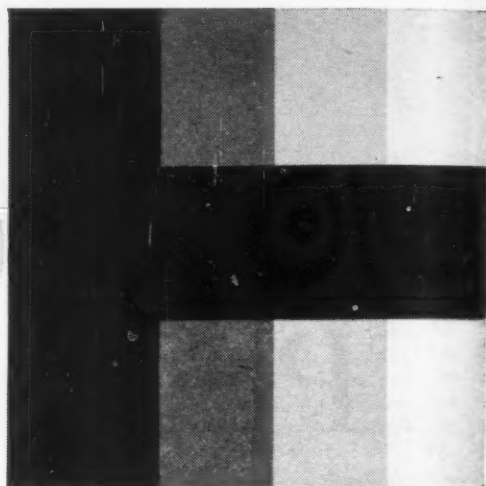
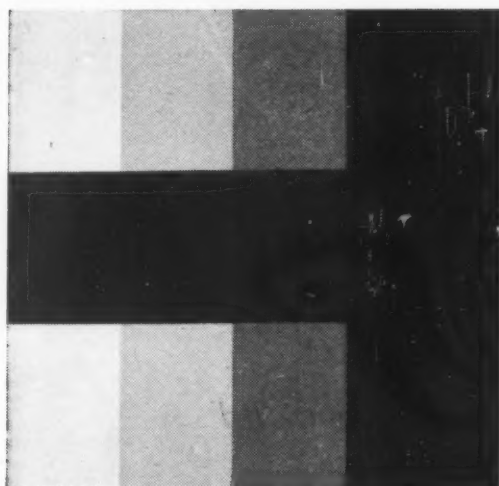
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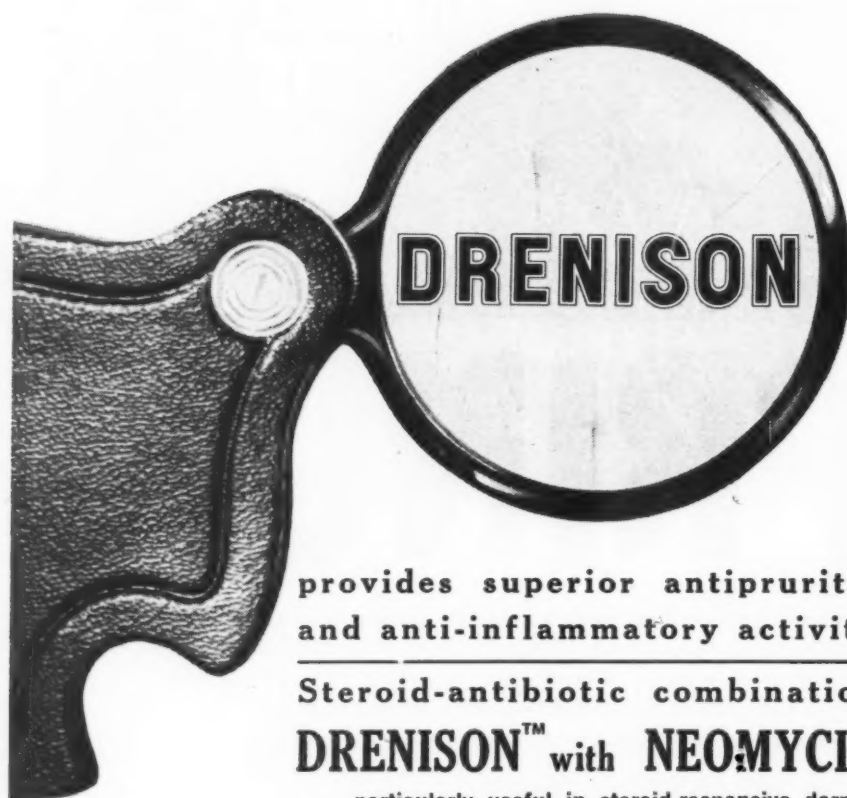
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Applications, addressed to the Secretary to the Public Service Board, Public Offices, Treasury Place, Melbourne, C.2, and accompanied by evidence of qualifications and experience and a statement of date and place of birth, are invited for the abovementioned positions up to Wednesday the 17th January, 1962.

Yearly Salary: Male £2443 minimum, £3123 maximum; Female £2256 minimum; £2936 maximum.

Duties: To carry out medical inspections of school children and other medical duties as directed.

Qualifications: A legally qualified medical practitioner of Victoria.

Note: Applicants must be prepared to undertake country duties, and should furnish evidence of hospital and other experience.

**NORTHERN New South Wales** country town group offers a one third partnership following a satisfactory period of assistantship. Salary £3000 per year, car allowance and rent free married accommodation available. Write No. 207 c.o. this office.

**LONG TERM LOCUM** required for 2-man practice on south coast 100 miles from Sydney. March to November, 1962, inclusive. Single male. Work one weekend per month. Live in. 55 guineas weekly, 5 guineas car allowance. Further particulars Box 200 c.o. this office.

## VICTORIA. VICTORIA.

**PROVINCIAL** (base hospital) CITY P'SHIP requires competent LOCUM for absent partner for 12 months. Locum fees (£60 guineas per week) plus SUBSTANTIAL BONUS. Successful locum will be offered half share in the P'SHIP after 12 months for NO CHARGE.

BRITISH MEDICAL AGENCY, 81 Collins Street, Melbourne, Vic. Telephone: 63-5643. Private: 83-7796.

**GENERAL Practitioner Assistant** required with view to partnership in group practice in Brisbane suburb. Separate brick clinic building. £50 p.w. commencing, plus £5 car allowance. Write No. 202 c.o. this office.

**WANTED.** Locum for two weeks from January 20th, solo lock-up practice, industrial suburb, Melbourne. No mids. £70 per week. Ring BY 3812.

**ASSISTANT** with or without view or long-term locum required to replace third partner retiring from practice established over 20 years. Salary for married locum with car, £68 per week, that for assistant, £60 per week with rent-free flat. Write DR. M. C. MCKINNON and DR. P. WALTERS, 398 Crown Street, Wollongong, N.S.W.

**ASSISTANT** with definite view to partnership required. £70 weekly. Well equipped practice in eastern Melbourne suburb. Obstetrics, experience essential. Write No. 203 c.o. this office.



## POSITIONS VACANT—Contd.

**LOCUM** required for one month, January-February, for Newcastle (N.S.W.) partnership practice. Terms £50 per week plus accommodation and £5 per week car allowance. Reply Box No. 196 c.o. this office.

**THIRD SHARE** available in group practice in industrial city within 100 miles of Sydney. Modern central surgery and excellent hospital facilities. Brick residence with three bedrooms available at V.G. Gross takings £24,000. Preliminary short term assistantship can be arranged. Goodwill including share of surgery and fittings £4000, liberal terms. Salary during assistantship £50 per week, plus car allowance. Write No. 197 c.o. this office.

**GIPPSLAND (Vic.)** group requires assistant with view one fifth share after six months. Well equipped surgery, large modern hospital, all ancillary facilities. Liberal time off. House available. Salary £60 p.w. plus petrol and oil. Please reply to Box No. 201 c.o. this office.

## HOSPITAL APPOINTMENTS

SURAT HOSPITAL.  
MEDICAL SUPERINTENDENT (PART-TIME).

Applications are invited for the position of Part-time Medical Superintendent at the Surat Hospital with right of private practice. Salary classification £1835 per annum—four weeks' paid recreation leave per year. Superannuation not applicable to position.

Furnished residence is provided for which a rental of £2 per week is charged. A/C supply electricity, sewerage, hot water services and garage. Private surgery facilities are available in the building.

The Surat Hospital is a new brick hospital with a bed capacity of 16 and opened February, 1961. Daily average in-patients 10, out-patients 10.

Conditions of employment, two months' notice either side.

Applicants are to state marital status, qualifications, etc., and date available for duty and forward copies of references.

Applications close 22nd January, 1962, and should be addressed to the Secretary, Roma Hospitals Board, P.O. Box 124, Roma, Q'ld.

RYDE DISTRICT SOLDIERS' MEMORIAL HOSPITAL,  
DENISTONE ROAD, EASTWOOD (SYDNEY).

## RESIDENT MEDICAL OFFICERS.

Applications are invited from suitably qualified medical practitioners as Resident Medical Officers, 1st, 2nd or 3rd year, male or female. Bed capacity 230, including general 155, obstetrics 37, children's 37. Recently classified honorary medical staff. Salary will be in accordance with Hospitals Commission determination. Apply Medical Superintendent, 85-1211.

## CHARLEVILLE HOSPITALS BOARD.

## FULL-TIME MEDICAL SUPERINTENDENT.

Applications are hereby invited from registered medical practitioners for the position of Medical Superintendent of the Charleville Base Hospital. The position is a full-time one. A new brick residence available in hospital grounds. Free rental, electricity, fuel and power. Salary range £3240/£3290 per annum, plus basic wage adjustments, western allowance. Charleville Hospital has a daily average of 62 general in-patients, 6 maternity in-patients, 15 outpatients. Subject to Public Service Superannuation Scheme. Applicants to state marital status, age and experience.

Applications to be addressed to the Secretary, Charleville Hospitals Board, Post Office Box 219, Charleville, Q'ld.—V. T. QUARRO, Secretary.

## GLEESNOCK DISTRICT HOSPITAL.

The above hospital, situated 36 miles from Newcastle, with a bed capacity of 201 and an adjusted daily average of 141, invites applications for the position of

## MEDICAL SUPERINTENDENT

from registered medical practitioners.

Applicants should have had, in the aggregate, at least four years' medical administrative and clinical experience in approved public hospitals.

The salary is at a rate of £2942 p.a. with two annual increments of £125 and two of £50 to £3292 per annum.

Applications to be made in writing to the undersigned, stating qualifications, experience, marital status, etc. Copies of references to be attached to applications. List of duties available on request.—K. E. ROSE, Secretary and Chief Executive Officer.

## GLADSTONE HOSPITALS BOARD.

## RESIDENT MEDICAL OFFICER.

Applications are invited from registered medical practitioners for the above mentioned position at the Gladstone Hospital, Queensland.

Salary classification: first year £1620 p.a., second year £1835 p.a., third year £2050 p.a., fourth year £2300 p.a. The above salaries are subject to Basic Wage adjustments, at present £34 p.a.

Comfortable cottage available, single or married person—free board single appointee—or allowance £100 p.a. in lieu cottage and board.

Appointment terminable by one month's notice on either side.

Please forward application stating age, marital status, qualifications and experience to Secretary, P.O. Box 142, Gladstone, Q'ld., advising also date available to commence duties.

## THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND.

## REGISTRAR APPOINTMENTS FOR 1962.

Applications are invited for the following Registrar Appointments to the Otago Hospital Board's medical staff for the year commencing on 1st January, 1962:

1. Anaesthetic Registrar—Dunedin and Wakari Hospitals.
2. Ophthalmic Registrar—Dunedin Hospital.
3. Psychiatric Registrar—Dunedin Hospital.
4. Surgical Registrar—(part-time thoracic surgery and part-time neurosurgery), Wakari and Dunedin Hospitals.

Salary Scales.—In accordance with the Hospital Employment (Medical Officers) Regulations, the salary scales will be:

Junior Registrars:  
£(N.Z.)1220-£(N.Z.)1300 per annum.

Senior Registrar:  
£(N.Z.)1400-£(N.Z.)1600 per annum.

The commencing rate of salary will be determined in accordance with the appointee's qualifications and experience.

Where appointees are authorized to live out, an allowance of £200 will be paid.

Facilities and courses are available for postgraduate study for higher degrees in medicine and surgery and it is anticipated that the primary examinations will be held in Dunedin in 1962.

Travelling expenses will be paid in accordance with the information contained in the conditions of appointment, which together with the prescribed form of application may be obtained from the undersigned.

Applications, stating age, qualifications and postgraduate experience, together with testimonials, health and chest certificates, will be received by the undersigned until 10 o'clock a.m. on Monday, 5th February, 1962.—W. A. WILLIAMSON, Secretary, Otago Hospitals Board, P.O. Box 946, Dunedin, New Zealand.

PRESTON AND NORTHCOTE COMMUNITY HOSPITAL,  
BELL STREET, PRESTON, N.18, VICTORIA.

## SENIOR RESIDENT MEDICAL STAFF APPOINTMENT.

Applications are invited from legally qualified medical practitioners for appointment in this new hospital which is building up to an ultimate 312-bed capacity. Rotational duties in medicine, surgery, obstetrics and gynaecology and casualty.

Salary scale: Minimum £1350 (2nd year graduate) to £2150 (5th year graduate), together with free board and lodging.

Period of employment: 12 months commencing late January, 1962.

Further information and application forms obtainable from the Medical Superintendent (44-0241). Applications close 13th January, 1962.—R. H. KRONBORG, Manager.

HOSPITALS DEPARTMENT.  
ROYAL ADELAIDE HOSPITAL.

Applications from legally qualified medical practitioners registered or eligible for registration in South Australia invited by Board of Management and received by undersigned for positions of

## SENIOR RESIDENT MEDICAL OFFICER

for period of twelve months from 1st February, 1962.

Rosters available are:

- 3 monthly rotation in gynae: gynaecology; orthopaedics, ophthalmology and ear, nose and throat department.
- 3 monthly rotation in thoracic surgery; surgical professional unit; orthopaedics and gynaecology.
- Rotating reliever—1 month ophthalmology; surgical professional unit; ear, nose and throat; thoracic surgery; 1 month gynae; 3 months gynae; 3 months medical professional unit.

Applicants should indicate their roster preferences, and note that on orientation period of two days held immediately prior to 1st February, 1962.

Salaries: Second year after graduation £1331 per annum; third year after graduation £1631 per annum. (Note: The salary rates quoted include an amount of £75 which is payable only if the work and conduct of the appointee throughout the term of appointment are considered by the Board of Management to be satisfactory.)

Accommodation available for single persons. A deduction at rate of £160 per annum made if full board and lodging provided; a proportionate deduction made for partial board and/or lodging.—C. G. RANKIN, Administrator.

## ADELAIDE CHILDREN'S HOSPITAL, INC.

## DIRECTOR OF ANAESTHETICS AND RESUSCITATION.

Applications are invited from legally qualified medical practitioners for the position of Director of Anaesthetics and Resuscitation. Qualifications: All applicants must have a senior qualification in anaesthetics and a sound knowledge of resuscitation.

Duties: Include the direction of the Department of Anaesthetics and Resuscitation; the supervision and teaching of resident medical officers in anaesthetics and resuscitation; the acceptance of some responsibility in postgraduate and undergraduate teaching; the provision of consultations in anaesthetic matters to members of the honorary medical staff.

Conditions: The appointment is full-time for a period of three (3) years with eligibility for reappointment.

The salary rate is £3251 per annum. Normal recreation, sick and long service leave privileges are available; also superannuation benefits.

All applicants are requested to submit full professional and personal details and name three referees, and forward to the undersigned not later than 12 noon, 1st February, 1962.

The successful applicant will be expected to take up duties on 1st April, 1962.—E. H. D. LINES, Chairman, Executive Officer.

## HOSPITAL APPTS.—Contd.

RACHEL FORSTER HOSPITAL  
FOR WOMEN AND CHILDREN, REDFERN, N.S.W.

## RESIDENT MEDICAL OFFICERS.

Applications are invited for the appointment of Resident Medical Officers (Female, Junior and Senior) for 1962.

Duties to commence January 8, 1962.

Salary in accordance with the Hospitals Commission determination. Phone General Superintendent, 69-2591.

MARY C. PUCKEY,  
General Superintendent.

## ST. LUKE'S HOSPITAL, DARLINGHURST.

## RESIDENT MEDICAL OFFICER.

Applications are invited for the above position. Vacancy is for one full year R.M.O. Salary and conditions as per current determination, i.e. at present £36 13s. 11d. per week. A modern self-contained 2-bedroom flat at rental of £4 per week is available for term of appointment. Copies only of any references to be enclosed.—W. M. LAWRENCE, Secretary and Chief Executive Officer.

## FAIRFIELD DISTRICT HOSPITAL, THE HORSLEY DRIVE, FAIRFIELD, N.S.W.

## HONORARY MEDICAL STAFF.

Applications, addressed to the Secretary and closing on Wednesday, January 24, 1962, are invited from legally qualified medical practitioners for the position of Temporary Honorary Relieving Physician, for the period 1st March to 1st October, 1962.

Application forms and further information may be obtained, on request, from the undersigned.—J. J. SMITH, Chief Executive Officer and Secretary.

## ADELAIDE CHILDREN'S HOSPITAL, INC.

## REGISTRAR IN ANÆSTHETICS.

Applications are invited for the position of Registrar in Anæsthetics at the above hospital, commencing duties on 1st April, 1962.

Applicants should have special experience in anæsthetics and hold a special qualification, or be studying for a qualification in anæsthetics.

The appointment is full-time for one (1) year with eligibility for reappointment, and the successful applicant shall work under the direction of the Director of Anæsthetics.

Salary shall be paid according to experience and qualifications, and will be in the range of £1631.10s.6d. per annum. Normal leave benefits are available.

Applications containing full professional and personal details, together with the names of three referees, must be provided to the undersigned not later than 12 noon, 28 February, 1962.—E. H. D. LINES, Chief Executive Officer.

## SYDNEY HOSPITAL.

## ASSISTANT MEDICAL SUPERINTENDENT.

Applications closing January 22, 1962, are invited for the above position tenable for 12 months from the date of taking up appointment. The appointee will be eligible for reappointment each year up to a total of three years.

Salary will be at the rate of £2602 per annum and is subject to basic wage variations.

The position is covered, as regards conditions of employment, in accordance with the Hospitals Commission's determination of 6th July, 1960.

Applications should be forwarded to the undersigned, giving full details of graduation, hospital experience and present appointment.—E. C. DOCKING, Secretary.

## THE PRINCE HENRY HOSPITAL, SYDNEY, N.S.W.

## APPOINTMENT OF HONORARY CLINICAL ASSISTANTS IN ANÆSTHETICS.

The Prince Henry Hospital, which is a teaching hospital of the University of New South Wales, invites applications from suitably qualified medical practitioners for appointment as Honorary Clinical Assistants in Anæsthetics.

Applications should include name, age, marital status, nationality, University record, hospital experience, names of referees and any other relevant information.

Applications close on January 16, 1962.—H. H. DICKINSON, Chief Executive Officer.

## FAIRFIELD DISTRICT HOSPITAL.

## HONORARY MEDICAL STAFF.

Applications, addressed to the Secretary and closing on Tuesday, 16th January, 1962, are invited from legally qualified medical practitioners for the position of Honorary Psychiatrist, for the balance of term until the 1st November, 1962.

Application forms and further information may be obtained, on request, from the undersigned.—J. J. SMITH, Chief Executive Officer and Secretary, Fairfield District Hospital, The Horsley Drive, Fairfield, N.S.W.

## RENWICK HOSPITAL FOR INFANTS, SUMMER HILL.

Applications, on the prescribed forms, are invited for the position of

## RESIDENT MEDICAL OFFICER.

The hospital has a daily average of 55 in-patients and offers an opportunity to those seeking experience in paediatrics. Salary is in accordance with the Hospitals Commission determination. Further particulars may be obtained from the Medical Superintendent (71-0318).—W. L. PERRY, Secretary, Benevolent Society of New South Wales, 188 Oxford St., Paddington.

## CANTERBURY DISTRICT MEMORIAL HOSPITAL, CANTERBURY ROAD, CAMPSIE (SYDNEY).

Applications are invited for

## RESIDENT MEDICAL OFFICER.

Male and female accommodation available. The successful applicant would be required to commence duties on Monday, 8th January, 1962.

General, maternity and large out-patients and clinical services. A.D.A. 200-3.

Salary in accordance with the Medical Officers' Agreement would be: First year £20 18s. 10d. per week, second year £26 13s. 11d. per week.

Applications should be addressed to the undersigned.—H. M. WEST, Secretary and Chief Executive Officer.

## MOSSMAN HOSPITALS BOARD, NTH. Q'LD.

## MEDICAL SUPERINTENDENT, MOSSMAN.

Applications are invited for the position of Part-time Medical Superintendent to the Mossman Hospitals Board. Appointee to have the right of private practice.

Salary range £1630 to £1755 per annum. Free residence, fuel and light provided. Medical Superintendent visits Daintree and Port Douglas Clinics weekly for which an additional fee is payable.

Applicants are requested to indicate earliest date available to commence duty.

Applications to state age, marital status, qualifications, are to be addressed to the Secretary, P.O. Box 103, Mossman.

## WAGGA WAGGA BASE HOSPITAL, N.S.W.

Full-time qualified

## MEDICAL PATHOLOGIST

for well established and equipped laboratory at this hospital, to serve this base hospital area. Technical staff employed.

Salary in accordance with the Hospitals Commission N.S.W. determination ranging from £2920 to £3520 according to specialist experience. Further particulars available from our Medical Superintendent.

Immediate applications, stating full name, age, qualifications and experience to A. B. SADLER, Chief Executive Officer and Secretary.

## ROYAL NEWCASTLE HOSPITAL.

## REGISTRAR IN RADIOLOGY.

A vacancy exists for a Registrar in the X-Ray Department (Diagnostic).

The department is under the direction of a full-time radiologist. The hospital is fully approved for specialist training for the Diploma in Diagnostic Radiology of the University of Sydney, and for the Diploma of the College of Radiologists of Australasia.

Salary: 1st year £1789, 2nd year £1939, 3rd year £2089.

Applications should be forwarded to the radiologist, Dr. Morris Owen.—A. E. SHARP, Secretary.

## AUSTIN HOSPITAL, HEIDELBERG, VICTORIA.

## PAID SESSIONAL MEDICAL STAFF.

The Committee of Management invites applications from clinicians of consultant status for a post on the paid sessional medical staff of this hospital as

## CHAIRMAN—AUSTIN CONSULTATIVE CLINIC.

The work of the Clinic relates to the diagnosis and treatment of patients in all forms of cancer, and will be carried out in close cooperation with the Peter MacCallum Clinic.

It is expected that the Chairman will be required to attend for at least two, and probably three, half-day sessions per week.

The appointment, in accordance with the hospital's by-laws, will be for a term ending on 1st March, 1965.

The rate of remuneration will be within the Hospitals and Charities Commission approved scale of £450 to £500 per session per annum.

A Memorandum of Information relating to the position will be made available on request.

Applications will be received until 4 p.m. on 9th January, 1962, and should be on forms available from the undersigned.—W. M. POWELL, Manager and Secretary.

## TOOWOOMBA HOSPITALS BOARD.

## TOOWOOMBA HOSPITAL.

## RESIDENT MEDICAL OFFICERS.

Applications are invited to fill a vacancy as a Resident Medical Officer at the Toowoomba Hospital for the year 1962.

Classification Medical Officer: Minimum £1620, maximum £2300; plus basic wage adjustment to date £34.

Staff quarters available for single officers only. Officers living out receive an extra allowance of £100 p.a.

Full time medical staff comprise Medical Superintendent, Surgical and Medical Registrars and five Resident Medical Officers.

Specialists in general surgery, medicine, radiology, E.N.T., orthopaedic, ophthalmology, paediatrics, gynaecology, obstetrics, neurology and psychiatry visit the Toowoomba Hospital on a sessional basis.

Daily average: In-patients—general 170, maternity 30, thoracic 40; out-patients 130.

Applicants to give full particulars of past experience, marital status, age, and also attach certified copies of testimonials held.

Termination of service, one month's notice on either side.

The above position is not subject to superannuation.

Applicants shall undertake to stay for the whole year of 1962.

Applications to be submitted to the Secretary, Hospitals Board, Toowoomba (Queensland).—J. SEAWRIGHT, Secretary.

Xmas 1961

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HOSPITAL APPTS.—Contd.

RACHEL FORSTER HOSPITAL,  
PITT STREET, REDFERN,  
N.S.W.

PATHOLOGIST (FULL-TIME).

Applications are invited for the  
position of Pathologist at the above  
hospital. Salary in accordance  
with the Hospitals Commission  
determination. Duties to com-  
mence January, 1962. Apply Gen-  
eral Superintendent. 69-2591.

SPRINGSURE HOSPITALS  
BOARD.

PART-TIME MEDICAL  
SUPERINTENDENT.

Applications are invited for the  
position of Part-Time Medical  
Superintendent at the Springsure  
Hospital.

Salary classification: £1510-  
£1635 p.a.

The appointment carries the  
right of private practice.

Four weeks' annual leave on full  
pay.

A spacious unfurnished resi-  
dence is provided by the Hospitals  
Board free of rental, including  
private surgery.

Two months' notice of termina-  
tion of employment to be given on  
either side.

Applications should include age,  
marital status, qualifications and  
experience of applicant, together  
with references, and should be  
addressed to the Secretary, Spring-  
sure Hospitals Board, P.O. Box  
14, Springsure, Queensland.—J. W.  
SMITH, Secretary.

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ROYAL PERTH HOSPITAL,  
WESTERN AUSTRALIA.

MEDICAL REGISTRAR—1962.

Applications are invited from  
legally qualified medical practi-  
tioners for the following post.

Medical Registrar in the Cardio-  
vascular Investigation Unit.

(This post becomes vacant, March  
1st, 1962.)

Applicants must be graduates of  
at least two years' standing.

Salary: Within the range of  
£1672-£2548 per annum, according  
to qualifications and experience.  
Of this, £194 per annum is de-  
ducted for living in.

First class single rail fare will  
be refunded from capital city of  
State in which applicant is resi-  
dent, on completion of twelve  
months' service.

Applicants should state particu-  
lars of qualifications and experi-  
ence, the names and addresses of  
two referees and enclose a recent  
photograph.

Applications should be addressed  
to the Medical Superintendent.

Closing date: 15th January,  
1962.—JOSEPH GRIFFITH, Adminis-  
trator.

AYR HOSPITALS BOARD.

AYR HOSPITAL, N.Q.

RESIDENT MEDICAL OFFICER.

Applications are invited for the  
above position. Duties to include  
the administration of anaesthetics  
at the Home Hill Hospital.

Salary classification:

1st year £1620,

2nd year £1835,

3rd year £2050,

4th year £2300,

plus basic wage adjustment (at  
present £34) and northern allow-  
ance £30.

One month's notice on either side  
to terminate engagement. The  
appointment here is not subject  
to the Public Service Superannua-  
tion Scheme.

A residence has been constructed  
which cost £5000. Partly furnished  
—septic, hot water, electric hot  
wash boiler, electric stove, built-in  
cupboards.

Applications stating age, experi-  
ence, marital status, and date  
when can commence duties, to-  
gether with copies of references,  
to be lodged with the Secretary,  
Ayr Hospitals Board, Ayr, N.Q.

THE PRINCE HENRY HOS-  
PITAL, SYDNEY.RESIDENT MEDICAL STAFF  
VACANCIES.

The Prince Henry Hospital in-  
vites applications from suitably  
qualified medical practitioners for  
appointment as Senior Residents  
Medical Officers.

Salary is in accordance with  
agreement between the B.M.A. and  
the Hospitals Commission.

The hospital is now a clinical  
school of the University of New  
South Wales. A large building  
programme, now in progress, will  
provide all the facilities of a  
modern general hospital.

Applications, stating age, quali-  
fications, experience, etc., should  
be addressed to the undersigned—  
H. H. DICKINSON, Chief Executive  
Officer.

## MISCELLANEOUS

SCHOOL OF PUBLIC HEALTH  
AND TROPICAL MEDICINE  
(UNIVERSITY OF SYDNEY).

DIPLOMA IN TROPICAL MEDI-  
CINE AND HYGIENE.

A full-time course for the  
Diploma in Tropical Medicine and  
Hygiene will commence on 5th  
March, 1962, and will conclude  
with examinations which will ter-  
minate about the end of August.

The main subjects studied are  
tropical medicine, tropical hygiene,  
bacteriology and pathology, proto-  
zoology, helminthology, entomol-  
ogy and elementary medical sta-  
tistics. Practical demonstrations  
and instruction are also given in  
dermatology, ophthalmology and  
dentistry as related to residence  
in the tropics.

No fees are payable for the  
course of instruction; a fee of £10  
is charged for the Diploma.

DIPLOMA IN PUBLIC HEALTH.

A full-time course for the  
Diploma in Public Health will  
commence on 5th March, 1962, and  
will conclude with examinations  
which will terminate about the end  
of November.

The course is divided into two  
parts. Part I includes basic  
training in bacteriology, entomol-  
ogy and parasitology. Part II  
includes environmental hygiene  
and sanitation, epidemiology, occu-  
pational health, child health, vital  
statistics, and Public Health Law  
and administration.

A separate examination is held  
for each part and candidates are  
required to pass the examination  
of Part I before admission to the  
of Part II.

No fees are payable for the  
course of instruction; a fee of £10  
is charged for the Diploma.

Application for enrolment should  
be made to the Director of the  
above School.

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able. Lease. Phone 663-4636 (Syd-  
ney).



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**MISCELLANEOUS—Contd.**

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**FOR SALE**, "Cardiotrace" E.C.G. Works like new, complete, guaranteed, price £85; Cautey Units from £10; New Exam Couches from £18. Bowker, 28 Macquarie Road, Lane Cove, ring 44-1314 (Sydney).

**NO LET**, Edgecliff, Sydney. Modern professional rooms with secretary, on sessional basis. Convenient parking. Apply Box 193 to this office.

**NO LET**, Rooms, Blakehurst, Sydney, for Specialist, Wednesday afternoon or evening. £3 3s. per session. Rooms used by general practitioner other days. Box No. 415 c.o. this office.

**AFTERNOON Sessions** available, William Bland Medical Centre (Sydney). Front suite, fully furnished and with receptionist. Apply No. 189 c.o. this office or phone 36-7328.

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**ANNOUNCEMENT OF FELLOWSHIP IN MENTALLY RETARDED CHILDREN AND PHYSICALLY HANDICAPPED CHILDREN.**

A fellowship programme to start July 1, 1962, for training and research in the broad area of mental retardation, deviant child development, and physically handicapping conditions is being sponsored by the Child Development Clinic of the Department of Pediatrics and the Hospital School for Severely Handicapped Children at the State University of Iowa.

The Hospital School has a residential programme for 60 severely physically handicapped children with reasonably normal intelligence and also conducts an out-patient programme. All types of physical handicaps are considered but especially cerebral palsy. The Child Development Clinic is concerned especially with mentally retarded children but some children with psychosomatic disorders or other forms of neurological defect are also seen. While there are some in-patient activities, the Child Development Clinic operates chiefly as an out-patient unit. Both the Hospital School and the Child Development Clinic operate in conjunction with the Department of Pediatrics.

Duties would include close association with the children in the in-patient groups and helping with out-patient evaluations. Ample opportunity would be provided to do investigative work, the exact nature of which would be determined by the interests of the Fellow. Attending certain national or regional meetings and attending certain post-graduate courses would be a part of the fellowship programme.

An appointment of Fellow in the Department of Pediatrics will be offered with a stipend of \$6000 annually. Applications can be made to Dr. ROBERT B. KUHL, Department of Pediatrics, University Hospitals, Iowa City, Iowa, U.S.A.

**ADVERTISEMENTS**.—Copy for advertisements in this section of the Journal should be in the hands of the Manager ten days prior to date of publication. The rate is 35s. per single column inch with a minimum charge of 17s. 6d.

## ANTI-CANCER COUNCIL OF VICTORIA.

### TRAVEL GRANTS.

The Anti-Cancer Council of Victoria will consider applications for travel grants made under the following conditions:

1. A member of a medical or allied profession who is visiting centres abroad, may apply to the Anti-Cancer Council of Victoria for a travel grant, provided that all or part of his activities during his visit are directly related to the diagnosis or treatment of cancer, or to research into its causation.

2. Application will be considered in February and July each year, and should be forwarded to the Secretary, Anti-Cancer Council, not later than the 30th of the preceding month for travel in the succeeding year.

3. The amount of the grant will not exceed the cost of a round-the-world tourist class air fare. If studies in the field of cancer form only a part of the applicant's programme, an appropriate lesser amount may be granted.

4. Funds granted for travel will be paid to the applicant one calendar month before the proposed date of departure.

5. The applicant will be required to submit a written report of his cancer studies overseas within two months of the date of his return to Victoria.





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